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Providing Boiler Inspections at US Army Installations

How To Perform Internal/Operational, Efficiency, and Emissions Testing

Noel L. Potts

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How To Perform Internal/Operational, Efficiency, and Emissions Testing

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Abstract

US Army Regulation (AR) 420-1, *Army Facilities Management*, paragraph 23-36.d requires the inspection of all actively used high-pressure and high-temperature boilers at Army installations. These inspections identify and evaluate the effects on boiler condition and operation of improper water treatment, soot accumulation, and improper boiler installation. Improper water treatment in boilers can lead to corrosion and scaling of wetted surfaces, which in turn reduces equipment life and compromises operating efficiency. Regular inspections also identify repairs needed to ensure that the boilers will operate safely. This work provided boiler inspections at Army installations to identify deficiencies and provide recommendations for reducing corrosion and improving the efficiency and dependability of the boilers and associated boiler plant equipment. For a select number of boilers, measurements of efficiency and emissions were also taken.

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Preface

This study was conducted for Headquarters, US Army Installation Management Command (HQIMCOM) under the “FY11 IMCOM Installation Support Funds — Boiler Inspections Program,” via Military Interdepartmental Purchase Request (MIPR) W74RDV11737517E. The technical monitor was Ismael Meléndez, HQIMCOM.

This work was managed by the Energy Branch (CF-E) of the Facilities Division (CF), Construction Engineering Research Laboratory (CERL), US Army Engineer Research and Development Command (ERDC). The ERDC-CERL Principal Investigator (PI) was Noel L. Potts, CEERD-CF-E. Boiler inspections were performed by Atlantic Services, Inc. Franklin H. Holcomb is Chief, CEERD-CF-E. L. Michael Golish is Chief, CEERD-CF. The associated Technical Director was Martin J. Savoie. The Director of ERDC-CERL is Dr. Ilker R. Adiguzel.

CERL is an element of the US Army Engineer Research and Development Center (ERDC), US Army Corps of Engineers. The Commander and Executive Director of ERDC is COL Kevin J. Wilson, and the Director of ERDC is Dr. Jeffery P. Holland.

1 Introduction

1.1 Background

US Army Regulation (AR) 420-1, Army Facilities Management, paragraph 23-36.d requires the inspection of all actively used high-pressure and high-temperature boilers at Army installations. These inspections identify and evaluate the effects on boiler condition and operation of improper water treatment, soot accumulation, and improper boiler installation. Improper water treatment in boilers can lead to corrosion and scaling of wetted surfaces, which in turn reduces equipment life and compromises operating efficiency. Regular inspections also identify repairs needed to ensure that the boilers will operate safely. This work was undertaken to provide Army installation boiler inspections to:

1. Identify deficiencies
2. Provide recommendations to reduce corrosion and to improve the efficiency and dependability of the boilers and associated boiler plant equipment
3. (For selected boilers), take measurements of efficiency and emissions.

1.2 Objectives

The objective of this work was to ensure the safe and efficient operation of Army boilers by providing Army installations with internal/operational boiler inspections and efficiency/emissions testing.

1.3 Approach

The objectives of this work were met by:

1. Atlantic Services, Inc. was subcontracted by tribal Contractor MEC Development, LLC to provide the inspections of boilers to assess the effects of corrosion and scaling on the condition of the boilers for CERL as well as to fulfill the annual safety inspection required by Army Regulation 420-1, paragraph 23-36.d.
2. Boilers and associated boiler plant equipment at Army installations were inspected to identify deficiencies and provide recommendations for reducing corrosion and improving efficiency and dependability.

Appendix A to this report summarizes the results of all 2012 boiler inspections.

3. For selected boilers, efficiency and emissions measurements were taken.
4. Procedures performed to accomplish these inspections and tests were documented, analyzed, and written into report form for use by Army installation Directorates of Public Works (DPWs). Appendix B to this report includes a detailed description of forms and processes for ordering boiler inspection supplies and services.

1.4 Scope

The inspections and tests described in this report are applicable to all boilers located on Army installations.

1.5 Mode of technology transfer

This report will be made accessible through the World Wide Web (WWW) at URLs:

<http://www.cecer.army.mil>

<http://libweb.erdclib.usace.army.mil>

2 Boiler inspections

Boiler inspections must be performed by inspectors who have been commissioned by the National Board of Boiler and Pressure Vessel, and who have been certified as competent to apply the American Society of Mechanical Engineers (ASME), ASME CSD1 (Controls and Safety Devices for Automatically Fired Boilers) and the National Board Inspection Code (NBIC) for boiler safety inspections.

The applicable Code books that pertain to the boiler inspections include:

- ASME Section 1 Power Boilers (ASME 2010a).
- ASME Section 4 Heating Boilers (ASME 2010b).
- ASME-CSD1 (Controls and Safety Devices for Automatically Fired Boilers) (ASME 2012)
- NBIC (National Board 2012).

The contracting office assigns specific locations to the Inspector, and provides the Inspector with the Statement of Work, the appropriate boiler inspection report forms, and the boiler list, which includes the boilers to be inspected and the location's Point of Contact (POC). The Inspector coordinates visit dates with the POC and with local boiler plant personnel. Four (4) weeks before the Inspector's installation visit, the Contractor confirms, in writing, the schedule and date for the upcoming visit. A copy of that confirmed visit is sent to the Contracting Officer's Technical Representative (COTR) two (2) weeks before the visit. Within (but not more than) five (5) working days before the visit date, the Contractor contacts the POC in writing to reconfirm the date of the visit, and to ensure that each boiler will be ready and available for its scheduled inspection or test. When reconfirming the visit, the Contractor shall send the installation POC the confirmed schedule, which lists the boilers for that installation (only).

Any pertinent information, such as a boiler not being ready, removed from service, torn down, etc., will be submitted to the COTR as soon as possible. Any deviation from the original scheduling of the boiler, including type of inspection, must be approved by the COTR. Ideally, the dates of inspection visits will be confirmed four (4) weeks before the scheduled visit, and the

preparation of the boilers will be confirmed within five (5) days before the Inspector's arrival at the location. Schedules of boiler inspections are submitted to the contacting office. Army installation personnel are tasked to prepare the boiler for the internal inspection as described in paragraph 4 of the contract (Appendix B).

For an internal Type A inspection, prepare the boiler to be inspected in the following manner:

1. To secure the boiler, the steam header valve is closed. At this time, the boiler is allowed time to cool down to prevent injury to Inspector.
2. All pressure is vented and water supply to the boiler is closed.
3. Drain valves are then opened on boiler.
4. Manholes and hand-holes covers are opened and removed.
5. The fire box is also opened.
6. The boiler is inspected and cleaned as necessary. This includes the water and fire sides.
7. Ensure that necessary repairs are complete, and clean the floor and surrounding area for the Inspector.

For the operational, Type C inspection, follow these procedures:

1. Ensure that all boiler controls, safeties, and boiler-related components are operational.
2. Bring boiler pressures up to a safe level and ready to go online, if the boiler is not already online.
3. Personnel should then wait for instructions from the Inspector and work with the Inspector through the steps required to perform a thorough inspection on that boiler.

2.1 Pre-inspection meetings

On arrival at the agreed location, the Inspector and the base POC(s) shall:

- Review the equipment list to verify which kind of inspection each boiler is prepared for and if any changes have occurred.
- Confirm safety procedures for Type A internal inspections.
- Determine the order of inspections to accommodate units that have high priority to be returned to service or that have personnel waiting to perform maintenance on the boiler.
- Discuss other items include the coordinating with various on-site work leaders to economize travel around the base.

On-site facility engineering personnel have the primary responsibility of following the Occupational Safety and Health Administration (OSHA) Confined Space procedures. At the initial meeting, the Inspector and the base POC(s) shall:

- confirm with the facility personnel lock-out/tag-out procedures pertaining to the fuel system, electrical system, and feedwater systems.
- confirm that there is proper ventilation in all areas to be entered
- discuss the necessary safety procedures to be followed in those confined spaces.

All of the discussed procedures shall be in accordance with the accepted OSHA Confined Space guidelines. On-site at each individual Boiler, the Inspector takes time to confirm that all of the discussed procedures have indeed been adhered to. The Inspector is his own “best” safety personnel on-site. No space is entered if the Inspector or facility personnel deem that space to be unsafe in any way.

2.2 Perform Type A or Type C inspection

2.2.1 Type A inspection

2.2.1.1 External inspection

The Type A External Boiler Inspection is performed as follows:

1. Perform a visual external inspection to confirm that the boiler Safety Lock-out and Tag-outs are in place on the Fuel Train and the Burner, and that the steam and water lines are directly connected to the unit.
2. Perform an external inspection of the boiler, including visual inspection of the fuel train, vent piping, safety relief valves and discharge piping, steam and water piping and the boiler setting/foundation. In particular, the Inspector checks for fuel train leaks, or poor pipe or joint quality.
3. Do the same external assessment for the water and steam piping. Check safety valve vent piping for proper installation and support. Note that the piping is often very heavy and cannot be allowed to rest on the safety valve itself; it must discharge at an appropriate location.
4. Visually confirm that the appropriate hand-holes, manways, and access ports are open. Inspect the insulation and external skin of the unit for hot spots, evidence of leakage, deterioration, or other problems.
5. The Inspector should use personal judgment on the proper calibration of the pressure gauge. If the gauge has been recently calibrated, there

- will be a calibration tag on the gauge. The Inspector will assess the gauge and its accuracy during the Type “C” test while the unit is under pressure. The boiler pressure is identified on several gauges at the same time. The primary gauge is compared to the other system gauges to assess whether there is general concurrence with those devices. If the Main pressure gauge varies substantially, then the gauge is probably out of calibration. If the readings concur, then the gauge is considered to be in calibration.
6. Perform a general visual inspection of the sight glass, water column during operational inspection. The gauge glass and associated water column must accurately reflect the water level. The level can be seen to vary during the low water test and when the column is blown down. The water column and the low water cut-off (LWCO) float assembly are generally opened by the facility before the inspection. During the inspection, each can be visually assessed for collections of debris, sediment, or foreign material that can impede water flow and give false water level readings.
 7. Visually assess bottom blow piping and surface blow piping externally during both internal and operation inspections to ensure that they are intact and functional.
 8. Visually assess the fuel train venting to ensure that it is in place and in compliance with ASME CSD-1 specifications for placement and proper point of discharge. The safety valve/relief valve outlets must be piped to a safe point of discharge. Since each boiler plant layout is different, the outlets are considered acceptable if they discharge to a place where an unexpected discharge will not cause danger to personnel or equipment. Depending on size, steam and hot water valves can generally discharge to the roof or the floor. The drip pans and/or the valves have 1/4-in. vent holes in them. These have two purposes: to drain away collected fluid from the valve body to diminish rust and corrosion of the valve parts, and provide operators an early indication of valve leaking.
 9. Confirm that the basic boiler data on the report (including the National Board number, the output capacity, safety valve capacity etc.) is correct and accurate and/or retrieve the data on “new” boilers. Safety valves/relief valves are sized by their relieving capacity or by the amount of energy release when the valve is open. The safety valve/relief valve capacity must exceed the energy output rating of the boiler. The safety valve/relief valve lifting pressure is to be at or below the boiler rated Maximum Allowable Working Pressure (MAWP).

2.2.1.2 Internal inspection

The Type A Internal Boiler Inspection requires access to the boiler's internal watersides and firesides for inspection. On many Firetube (FT) boilers, the front and back of the boiler has hinged doors that swing open for access to the firesides. The watersides are accessed through lower hand-holes and a top man-hole. The Inspector may enter the firesides if the main Fire Tube (Morison Tube) is large enough. Generally, there is plenty of access to firesides through open doors and to watersides through hand-holes so that a thorough inspection can be performed without entry. However, entry is sometimes needed for closer visual scrutiny of a defect.

Watertube (WT) boilers have separate manways for entry to the furnace (firesides) and the steam drum and mud-drum (watersides). Generally, the Inspector will "crawl" into both watersides and firesides when performing an internal inspection. Inside the steam drum, the fittings and appurtenances (pans, feed piping, chemical piping, cyclone separators, screens etc.) are checked for integrity and appropriate positioning.

2.2.1.3 Firesides internal inspection

For the firesides of the boiler, the Inspector will check refractory for fracturing, sagging, crumbling, and poor stability, which might indicate need for repair or replacement. For the FT Boilers, the Inspector should focus on the burner cone, liner, and door refractory. For the WT Boilers, the Inspector should focus on the cone/front wall, rear wall and directional baffles. In addition, exposed steel tubes are scrutinized for signs of flame impingement, overheating, misalignment, and carbon build-up. These are indications that the burner is not firing properly and needs tuning or adjustment.

2.2.1.4 Watersides internal inspection

During the watersides inspection, the Inspector visually identifies the presence of corrosion, scale, and sludge.

CORROSION. Corrosion is the primary problem to be identified. Corrosion can come in many forms. General surface corrosion can occur over the large area of the steel surfaces including, but not limited to, the steel surfaces in the steam drum and tubes. Pitting is another form of corrosion

that is identified by “blisters” along the surfaces of the steel and tubes. Both generalized corrosion and pitting are primarily caused by the presence of oxygen in the boiler water, and can be controlled by removing oxygen from the feedwater in the Deaerator (DA) Tank in conjunction with proper chemical treatment with an oxygen scavenger such as sulfite.

The Inspector notes corrosion and oxygen pitting when found on the watersides. Surface corrosion can be found on tubes, tubesheets, and in steam-drums, most often near the waterline in steam boilers. Oxygen pitting can also occur anywhere in a boiler, but is most often found at or near the waterline. All steel surfaces are visually inspected for corrosion, pitting, thinning (steel diminishment), and erosion.

SCALE. Over time, thin scale can become a relatively common occurrence in boilers. Scale is the deposit of the hardness components present in the feedwater onto wetted boiler surfaces including fire-tubes and water-tubes. Since scale is a good insulator, the thicker the scale, the greater the potential for tube overheating. The amount of scale present is key, and the thickness of any identifiable scale is the important factor. The Inspector pays particular attention to scale that has become thicker than 1/16th in. Scale accumulation is manageable by proper feedwater treatment and the use of softeners.

The watersides are inspected for the accumulation of scale or deposits. Scale can plate out on all steel surfaces of a steam boiler. However, heavier scale accumulates on the lower steel surfaces of the tubes, mud-drum, and boiler shell.

SLUDGE. Sludge is a by-product of the components of entrained scale-forming salts in the feedwater reacting with the boiler chemicals. Sludge tends to drop to the mud-drum in a WT boiler and to the bottom of the boiler shell in an FT boiler. If proper bottom blowdown procedures are consistently followed, sludge accumulation will be minimized or eliminated.

2.2.2 Type C inspection

The Type C Boiler Inspection (External Under Operation) is performed to confirm the operational safety of the controls and cutouts on the boiler. Although the test is similar for both WT and FT boilers, controls and cut-

outs can vary between boilers designed and constructed in different decades. Also, while the operating controllers of natural gas and oil-fired boilers generally have similar designs, coal boilers (stokers) have completely different operating requirements and control demands. Confirm the type of safety cutouts to be tested with the on-site facility operating engineers. Also confirm whether the unit can be turned off and on through the testing sequence. After confirmation, the basic inspection proceeds as follows:

1. With the boiler online, perform a visual external inspection to confirm that there are no obvious problems with the fuel train (gas or oil) or the stoker/grate in a coal boiler.
2. Visually confirm that there are no leaks or substantial drips at any hand-holes, manways, access ports, or fittings. Inspect the insulation and external skin of the unit for hot spots, evidence of leakage, deterioration, or other problems. Often during the operation inspection, the bottom blow valve is opened and tested.
3. Confirm that the basic boiler data on the report, including the National Board number, the output capacity, safety valve capacity etc., is correct and accurate and/or retrieve the data on “new” boilers.
4. On forced draft boilers, fired on gas or oil, test the following components in this sequence:
 - a. The primary low water cutout.
 - b. The secondary low water cutout.
 - c. The low water alarm (should sound during low water test).
 - d. Flame scanner.
 - e. The operating pressure cutout (temperature cutout-Hot Water [HW] Boilers).
 - f. The high-pressure cutout (high-temperature cutout – HW Boilers).
 - g. The igniter, which is tested as part of the firing process and must reliably function each time.
 - h. Observe the purge cycle between the cutout cycling of the unit. This is usually a 1-2 minute purge at the re-firing of the burner. It is an integral part of the igniter because the burner sequence opens the air damper for full air purge and then closes down to trigger the igniter sequence.
 - i. The safety valves, which can be tested in various ways. Most commonly, the procedure for testing steam safety valves entails lifting the valve by hand while under pressure. Although the boiler *should* be under pressure equal to or above 75% of the lifting pressure rated on the stamping plate of the valve, there is some latitude on the

75% rated pressure. Many times, when the boiler is at an operating pressure less than the 75% recommended lifting point, the lifting gear is fully capable of testing the valve. The Inspector may use professional judgment to assess whether to test a safety valve by handlifting when the boiler pressure is less than the 75% recommended pressure point.

Another type of testing allowed by the NBIC and ASME would be the “pressure lift” test, in which the pressure of the medium (steam or hot water) in the boiler is used to fully lift the valve. Although this is the more thorough way to test the valve because it can confirm the lifting pressure stamped on the safety valve tag, this type of test is not used in most cases because the boiler must be isolated from the system so as not to pressurize the entire system. The handlift method is simpler, fully acceptable, and can be done without making adjustments to the boiler or isolating it from the downstream system.

Although both can be tested by the handlift or pressure lift method, there are notable differences in testing of the safety/relief valves of HW and steam boilers. Standard HW heating boilers run at lower pressures and temperatures and react similarly to steam boilers; handlift procedures are similar for both. Note that HTHW boilers and standard HW heating boilers present different challenges. By definition, HTHW boilers run at higher temperatures (above 250 °F) and pressures than do standard HW heating boilers. The safety valves on HTHW boilers are designed for the required higher pressures and temperatures. These valves have to withstand the stresses incurred from the violent flashing of the HTHW when the safety valve lifts. The relief piping must also withstand the violent flashing of the HTHW to steam at ambient atmospheric pressure. Although each HTHW valve has handlifting gear, the handlift gear is not used unless there is remote handlift mechanism allowing for operation of the valves at a safe distance.

The Inspector must make an assessment of each individual situation. In the past few years, there have been indications that safety valve quality is not as good as it had been in years past. Facility personnel may request that a valve NOT be hand tested because the

newer valves have a tendency to leak after handlifting. The Inspector will respect the facility request, but will ensure that the safety valves have been recently (i.e., five [5] years or less) certified by a qualified safety valve repair firm holding a safety valve (SV) stamp. In this way, the Inspector can verify that the valve has been recently checked.

- j. The testing of stoker coal-fired boilers differs from the testing of forced draft boilers because the ignition and burn processes of the two types of boilers are completely different. Stoker coal-fired boilers have a bed of coal on a slow moving grate, which burns continuously and cannot be “turned off,” but can be monitored. These plants are always “manned” operations. The standard plants are monitored automatically with alarms, which can be tested or confirmed for calibration. The components of the monitoring system that can be checked are:
 - (1) the low water alarm
 - (2) the furnace pressure monitoring system
 - (3) the induced draft (ID) Fan cutout
 - (4) the forced draft fan cutout
 - (5) the high-pressure (HP) steam alarm.

Since cutting off these coal boilers is not an option due to the long burn-time of the coal on the grate and the potential plant disruptions involved, the above test is the advised procedure.

2.2.3 Preparation of inspection reports

During the inspection, the Inspector documents his findings on the boiler inspection report form. As each boiler is inspected, the Inspector completes either a Type “A” or Type “C” Boiler Inspection Report. The report notes the condition of each boiler and the condition of the boiler plant and equipment associated with each boiler. It also notes reported repairs made since the date of last inspection. In the appropriate remarks section, the report identifies deficiencies and makes recommendations. If facility personnel have requested that safety valves not be tested, the report will include their signature to waive these tests. The Inspector will often review and check the report later in the day after the on-site inspections are completed to further clarify the findings.

2.3 Post-inspection meetings

On completion of all boiler inspections, the Inspector will meet with the installation POC and/or other facility engineering personnel. The Inspector presents an overview of the findings for all the boilers inspected. Specific deficiencies are addressed at that time. For example, should an internal inspection reveal corrosion on the waterside surfaces of a boiler, the Inspector will highlight the type of corrosion noted. After describing such findings, the Inspector will discuss the likely cause of the corrosion and the remedy options available to Facility Personnel to eliminate the corrosion from progressing (e.g., chemical treatment, etc.). As another example, an operational/safety item that might be discussed would be the failure of the low water cutout or other safety control.

After the various inspection items are discussed, the Inspector presents the reports to the installation POC or his representative for signature and copying.

2.4 Measure boiler efficiency and emissions

Note that any analyzer used for tests shall comply with CTM-034 Sections 4 and 5.* The Contractor shall submit analyzer verification to the COTR by the US Environmental Protection Agency's (USEPA's) Environmental Technology Verification Program (ETV), or by performing the verification test outlined the Statement of Work included in Appendix B to this report (on p 53).

The consultant in the pilot study for this guide used an ECOM J2KN-Industrial OCNX model portable emission analyzer with the ECOM DAS ver. 1.6.6.16 program (ECOM America 2012). This software program allows the user to customize functions and times for automatic control of the analyzer, data collection, and basic report generation required under the testing protocol specified in the contract. The outline below describes the steps to perform an Emissions & Efficiency Test on a boiler, using the above specified equipment and following the test procedures specified in the Task Contract.

* CTM-034 is accessible through URL: www.epa.gov/ttn/emc/ctm.html

2.4.1 Pre-test procedure

Before performing the stack tests on the boilers, perform basic maintenance and calibration of the analyzer. Basic maintenance steps:

1. Inspect the particulate filter in the top of the gas cooler assembly. Replace the filter if soiled.
2. Inspect the small round mesh filter on outlet line of gas cooler. Replace the filter if soiled.
3. Inspect the Potassium Permanganate filter media on top of analyzer. Replace the filter if discolored (brown/gray).

2.4.2 Calibration procedure

1. Turn the analyzer on and run it for 15–20 minutes in a thermally stable, fresh air environment. This step is necessary to allow the analyzer/sensors to acclimate to the ambient temperature. Once the analyzer/sensor temperature is stable, turn the analyzer off and then restart it. The restart sets the temperature compensation feature to the acclimated temperature. Make a note of the sensor temperature. The sensor temperature should vary by no more than ± 10 °F at any time during the course of testing.
2. With the analyzer running in a thermally stable, fresh air environment, calibrate the NO, CO, and NO₂ sensors. To calibrate the NO sensor, connect NO Span gas to the analyzer and adjust the flow, if needed, to match the Internal Flow displayed on the analyzer, typically 2.2 liters per minute (LPM) (± 0.2 LPM). Allow the gas to run for a minimum of 5 minutes and check the sensor response. Since NO Span gas = 81 parts per million (PPM), the analyzer should read 81 PPM. If it does not, adjust the sensor response to 81 PPM. Disconnect the gas and allow the analyzer to purge in fresh air until O₂ $\geq 20.8\%$ and NO, CO, NO₂ = ≤ 2 PPM. Repeat the above steps for CO calibration (199 PPM) and NO₂ calibration (81 PPM).

Start ECOM DAS /1.6.6.16 DAS program and select the Pre-Test Calibration Folder. The Pre-Test Zero & Span Test protocols are programmed. Select Pre-Test Zero and choose Start Recording. The Pre-Test Zero takes 15 minutes to complete. Once complete, perform the Pre-Test Span for NO, CO-O₂, and NO₂. Select the proper Pre-Test Span File (Pre-Test Span NO, Pre-Test Span CO-O₂, and Pre-Test Span NO₂).

Reconnect the NO Span gas, adjust the flow, if needed, and choose Start Recording. Flow the gas to the analyzer for 7 minutes (5-minute Ramp Up and 2-minute Test Phase). Once the Purge Phase begins, disconnect the Span Gas. Repeat the above steps for CO-O₂ Span and NO₂ Span. Once all the Pre-Test Calibration and Span checks are complete, any number of boilers may be tested over the immediate 10-day period. Post Test Zero and Span Checks must be performed within 10 days of completion of the Pre-Test Span procedure.

2.4.3 Boiler preparation and operation during test

1. The boiler to be tested should be operational and warmed up. One test port that completely penetrates to the boiler stack is required. The test port should be identified and is usually already installed on most boilers. If the boiler is equipped with an economizer, the test port will be downstream from the economizer outlet. When no economizer is present, the test ports should be at the boiler flue outlet.
2. Note the boiler operating parameters: fuel type, maximum Btu input, etc.
3. Set up the analyzer in an area that will minimize exposure to radiant heat and moisture, and insert the probe in the exhaust stack test port. Enter all the relevant boiler data.
4. The boiler should be ramped up to a stable operating load (85–90% is desired). Unless the steam or water demand will not allow this operating condition, or the boiler can be set to “Manual Mode” and steam or water dumped, the boiler should be operated at a high fire rate/load that it can maintain without disruption for a minimum of 7 minutes (5-minute Ramp Up + 2-minute Data).
5. Once boiler is has reached test conditions, select Begin Recording in the ECOM DAS program. The analyzer and personal computer (PC) will display real time values and record data at 15-second intervals. After the first 7 minutes (5-minute Ramp Up phase + 2-minute Data phase), the analyzer will automatically switch to purge and the 8-minute Purge Phase will begin. At this point the boiler can be relieved of high fire, if necessary.
6. Allow the analyzer to complete the purge phase. The DAS program will finish the 15-minute test and instruct the technician in the completion of the process.

2.4.4 Post test procedure

On completion of the last boiler test performed during the contiguous ten (10) day Test Period, remove the probe from the boiler exhaust stack test port and immediately perform the Post Test Zero. Select the Post Test Zero (already set up in the DAS program) and Start Recording. After the Post Test Zero is completed, perform the Post Test Span checks for NO, CO-O₂, and NO₂. This procedure is the same as the Pre-Test Span checks. Select the proper Post Test Span File (Post Test Span NO, Post Test Span CO-O₂, or Post Test Span NO₂). Reconnect NO Span gases, adjust flow, if needed, and choose Start Recording. Flow gas to the analyzer for 7 minutes (5-minute Ramp Up and 2-minute Test Phase). Once the Purge Phase begins, disconnect the Span Gas. Repeat above step for CO-O₂ Span and NO₂ Span.

2.5 Prepare report

The ECOM J2KN & DAS program generates raw data files that record the following parameters: Date, Time, O₂, CO, NO, NO₂, NOX, Exhaust Gas Temperature, Sensor (Cell) Temperature, Efficiency, & Flow.

The data is logged in 15-second intervals and stored in an MS® Excel® spreadsheet. It may be necessary to adjust some of the columns to format the data in the desired manner. These data become the Analyzer Data Reports and are then submitted for review by contracting office.

3 Conclusion

This work has provided boiler inspections at Army installations to identify deficiencies and provide recommendations to reduce corrosion and improve the efficiency and dependability of the boilers and associated boiler plant equipment. For a select number of boilers, measurements of efficiency and emissions were also taken.

The steps taken to perform this work, were used to compile a generalized guide to assist Army installation personnel to perform internal/operational, efficiency, and emissions testing of the boilers and associated boiler plant equipment on Army installations.

Acronyms and Abbreviations

<u>Term</u>	<u>Definition</u>
ACRN	Accounting Classification Reference Number
AR	Army Regulation
ASME	American Society of Mechanical Engineers
CEERD	US Army Corps of Engineers, Engineer Research and Development Center
CERL	Construction Engineering Research Laboratory
CO	Carbon Monoxide
CONUS	Continental United States
COR	Contract Officer Representative
COTR	Contracting Officer's Technical Representative
CSD	Controls and Safety Devices
CTM	Conditional Test Method
DA	Deaerator
DFARS	Defense Federal Acquisition Regulation Supplement
DFAS	Defense Finance and Accounting Service
DoD	US Department of Defense
DODAAC	Department of Defense Activity Address Code
ERDC	Engineer Research and Development Center
EST	Estimated
ETV	Environmental Technology Verification Program
FFP	Fast Field Program
FOB	Forward Operating Base
FSC	Federal Service Code
FT	Firetube
HP	High Pressure
HTHW	high-temperature hot water
HW	Hot Water
ID	Induced Draft
IDIQ	Indefinite Delivery/Indefinite Quantity
JTR	Joint Travel Regulation
LPM	Liters Per Minute
LWCO	Low Water Cut-Off
MAWP	Maximum Allowable Working Pressure
NA	Not Applicable

<u>Term</u>	<u>Definition</u>
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors
NBIC	National Board Inspection Code
NDAA	National Defense Authorization Act
NO	Nitrogen Oxide
NOX	(Nitrogen Oxide refers to NO and NO2)
NTE	Not To Exceed
OSHA	Occupational Safety and Health Administration
PBSA	Performance-Based Service Acquisition
PC	Personal Computer
PI	Principal Investigator
POC	Point of Contact
PPM	Parts Per Million
QASP	Quality Assurance Surveillance Plan
RFQ	Request for Qualifications
SF	Standard Form
SOW	Statement of Work
SV	Safety Valve
TR	Technical Report
UIC	Unit Identification Code
US	United States
USA	United States of America
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
WAWF	Wide Area Workflow
WT	Watertube
WWW	World Wide Web
XML	Extensible Markup Language

References

- American Society of Mechanical Engineers (ASME). 2010a. *2010 ASME boiler and pressure vessel code, section I: Rules for construction of power boiler*. New York, NY: ASME.
- . 2010b. *2010 ASME boiler and pressure vessel code, section IV: Heating boilers*. New York, NY: ASME.
- . 2012. *Controls and safety devices for automatically fired boilers*. ANSI/ASME CSD-1-2012. New York, NY: ASME.
- National Board of Boiler and Pressure Vessel Inspectors, The. 2012. *National Board Inspection Code (NBIC)*. Columbus, OH: The National Board of Boiler and Pressure Vessel Inspectors.
- ECOM America. 2012. ECOM®. JSKN PRO INDUSTRIAL: We've Outdone Ourselves (*Again*). Webpage. Gainesville, GA: ECOM America, Ltd. Accessed 11 September 2012, http://www.ecomusa.com/ecom_j2kn_pro_ind.php

Appendix A: 2012 Boiler Summary

Table A1. 2012 boiler summary.

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
ATLANTIC REGION										
Aberdeen Proving Ground, MD 21005										
345	1	1800	NG/Oil	S	WT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent
345	2	1800	NG/Oil	S	WT	Cleaver-Brooks	Jun-12	Fair	none	
345	3	700	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Excellent
525	1	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Unacceptable	Feb-12	Unacceptable
525	2	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent
525	3	200	NG/Oil	S	FT	Cleaver-Brooks	none		none	
700	1	80	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Unacceptable
2502	1	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent
2502	2	200	NG/Oil	S	FT	Cleaver-Brooks	none		Jun-12	Excellent
4119	3	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Unacceptable	none	
4219	1	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Unacceptable	Feb-12	Excellent
4219	2	200	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Unacceptable	none	
4312	1	125	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Poor	Feb-12	Fair
4312	2	150	NG/Oil	S	FT	Cleaver-Brooks	none		none	
4404	1	200	NG/Oil	W	FT	Donlee	Jun-12	Unacceptable	Feb-12	Unacceptable
4404	2	200	NG/Oil	W	FT	Donlee	none		none	
4600	1	500	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Excellent
4600	2	500	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
4600	3	500	NG/Oil	S	FT	Cleaver-Brooks	none		none	
E1574	1	80	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Excellent	Feb-12	Excellent
E1574	2	150	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Excellent	Feb-12	Excellent
E1574	3	150	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Excellent
E2100	3	60	NG/Oil	S	FT	Cleaver-Brooks	none		Feb-12	Excellent
E2188	1	100	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Excellent
E3312	1	800	Oil	S	FT	Cleaver-Brooks	none		Feb-12	Excellent
E3312	4	800	Oil	S	FT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent
E3312	5	800	Oil	S	FT	Cleaver-Brooks	none		Feb-12	Excellent
E4160	1	250	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Poor	Feb-12	Excellent
E4160	2	300	Oil	S	FT	Cleaver-Brooks	none		Jun-12	Excellent
E4160	3	300	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Feb-12	Excellent
E5126	1	1800	NG/Oil	S	WT	Cleaver-Brooks	Jun-12	Fair	Feb-12	Excellent
E5126	2	1800	NG/Oil	S	WT	Cleaver-Brooks	Jul-12	Fair	none	
E5126	5	1000	Oil	S	WT	Cleaver-Brooks	none		Feb-12	Excellent
Portable	1	250	Oil	S	FT	Cleaver-Brooks	none		none	
Adelphi Laboratory Center, Adelphi, MD 20783										
106	1	150	NG/Oil	W	WT	IBW	none		Mar-12	Excellent
106	2	350	NG/Oil	W	WT	IBW	none		Mar-12	Excellent
106	3	350	NG/Oil	W	WT	IBW	none		none	
106	4	350	NG/Oil	W	WT	IBW	Mar-12	Unacceptable	none	
106	7	350	NG/Oil	W	WT	IBW	none		none	

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
403	1	10	Oil	W	CI	Weil-McLain	none		none	
403	2	10	Oil	W	CI	Weil-McLain	none		none	
404	1	15	Oil	S	CI	Peerless	none		none	
406	1	15	Oil	S	CI	Peerless	none		none	
504	1	30	NG/Oil	S	CI	Burnham	none		none	
504	2	10	Oil	W	CI	A.O. Smith	none		none	
601	1	30	NG	W	CI	Weil-McLain	none		none	
601	2	30	NG	W	CI	Weil-McLain	none		none	
<i>Anniston Army Depot, Anniston, AL 36201</i>										
19	1	200	NG/Oil	S	FT	Burnham	May-12	Fair	Nov-11	Fair
19	2	200	NG/Oil	S	FT	Burnham	May-12	Fair	Nov-11	Fair
27	1	70	NG/Oil	S	FT	Burnham	May-12	Fair	Nov-11	Fair
87	1	50	NG/Oil	S	FT	Hurst	May-12	Poor	Nov-11	Unacceptable
362	1	300	NG/Oil	S	FT	Burnham	May-12	Fair	Nov-11	Fair
362	2	300	NG/Oil	S	FT	Burnham	May-12	Fair	Nov-11	Unacceptable
381	1	500	NG/Oil	S	FT	Hurst	May-12	Poor	Nov-11	Excellent
381	2	500	NG/Oil	S	FT	Hurst	May-12	Poor	Nov-11	Unacceptable
401	1	2400	NG/Oil	S	WT	Nebraska	Nov-11	Fair	May-12	Unacceptable
401	2	2400	NG/Oil	S	WT	Nebraska	May-12	Fair	Nov-11	Excellent
401	3	1500	NG/Oil	S	WT	Cleaver-Brooks	May-12	Fair	Nov-11	Unacceptable
501	1	600	NG/Oil	S	FT	Kewanee	May-12	Fair	Nov-11	Excellent
503	1	80	NG/Oil	S	FT	Hurst	Nov-11	Fair	May-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
647	1	150	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Fair	May-12	Unacceptable
654	1	125	NG/Oil	S	FT	Hurst	May-12	Fair	Nov-11	Fair
680	1	100	Oil	S	FT	Hurst	May-12	Poor	Nov-11	Fair
Fort Belvoir, VA 22060										
332	1	750	NG/Oil	S	WT	Erie City	Aug-12	Fair	Mar-12	Fair
332	2	750	NG/Oil	S	WT	Erie City	Aug-12	Poor	Mar-12	Fair
332	3	400	NG/Oil	S	FT	Cleaver-Brooks	Mar-12	Fair	Aug-12	Excellent
3138	1	200	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Poor	none	
3138	2	200	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Excellent	none	
3233	1	100	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Fair	Mar-12	Excellent
3233	2	100	NG/Oil	S	FT	Cleaver-Brooks	Aug-12	Excellent	Mar-12	Excellent
Fort Benning, GA 31905										
40	1	50	Propane	S	FT	York Shipley	Dec-11	Fair	Aug-12	Unacceptable
61	1	20	Propane	W	WT	Bryan	Aug-12	Fair	Dec-11	Excellent
2491	1	50	NG	S	FT	Hurst	Aug-12	Fair	Dec-11	Fair
2491	2	50	NG	S	FT	Hurst	Aug-12	Fair	Dec-11	Unacceptable
3025	1	100	NG	S	FT	Hurst	Aug-12	Unacceptable	none	
3105	1	40	NG	S	FT	Hurst	none		none	
3210	1	40	NG	S	FT	Hurst	none		none	
3240	1	40	NG	S	FT	Hurst	none		none	
3245	1	40	NG	S	FT	Hurst	none		none	
3305	1	40	NG	S	FT	Hurst	none		none	

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
3335	1	40	NG	S	FT	Hurst	none		none	
3405	1	40	NG	S	FT	Hurst	none		none	
3425	1	40	NG	S	FT	Hurst	none		none	
9202	1	400	NG/Oil	S	FT	Burnham	Dec-11	Unacceptable	Aug-12	Poor
9202	2	400	NG/Oil	S	FT	Burnham	Dec-11	Poor	Aug-12	Fair
9202	3	1000	NG/Oil	S	WT	Cleaver-Brooks	Aug-12	Poor	Dec-11	Unacceptable
Blue Grass Army Depot, Richmond, KY 40475										
571	1	250	NG	S	FT	Cleaver-Brooks	Jul-12	Poor	Jan-12	Unacceptable
571	2	250	NG	S	FT	Cleaver-Brooks	Jul-12	Poor	Jan-12	Excellent
1181	1	125	NG	S	FT	Sellers	Jul-12	Poor	Jan-12	Fair
Fort Bragg, NC 28307										
2-4406	1	125	NG	W	FT	Burnham	Mar-12	Excellent	Apr-12	Excellent
2-4406	2	125	NG	W	FT	Burnham	Apr-12	Excellent	Mar-12	Excellent
4-2811	1	700	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Mar-12	Excellent
4-2811	2	700	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Excellent	May-12	Excellent
4-2811	3	300	NG/Oil	S	FT	Cleaver-Brooks	Mar-12	Excellent	Apr-12	Excellent
5-3743	1	70	NG	W	FT	Burnham	Apr-12	Excellent	Jun-12	Excellent
5-3743	2	125	NG	W	FT	Burnham	Mar-12	Excellent	Apr-12	Excellent
5-3743	3	125	NG	W	FT	Burnham	May-12	Excellent	Mar-12	Excellent
A-2515	1	125	NG	W	FT	Burnham	May-12	Fair	Mar-12	Excellent
A-2547	1	250	NG	W	FT	Superior	May-12	Excellent	Apr-12	Excellent
A-2547	2	250	NG	W	FT	Superior	Apr-12	Excellent	Mar-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
A-2565	1	250	NG/Oil	W	FT	Superior	Apr-12	Excellent	May-12	Excellent
A-2565	2	250	NG/Oil	W	FT	Superior	Apr-12	Poor	none	
A-3247	1	300	NG	W	FT	Superior	none		Apr-12	Excellent
A-3247	2	300	NG	W	FT	Superior	Apr-12	Excellent	Mar-12	Excellent
A-3265	1	200	NG/Oil	W	FT	Superior	May-12	Excellent	Mar-12	Fair
A-3265	2	200	NG/Oil	W	FT	Superior	none		none	
A-4251	1	250	NG	W	FT	Superior	May-12	Fair	Apr-12	Excellent
A-4251	2	250	NG	W	FT	Superior	Apr-12	Excellent	Mar-12	Excellent
C-7620	1	100	NG/Oil	S	CI	Burnham	May-12	Excellent	Mar-12	Excellent
O-1900	1	200	Oil	W	FT	Cleaver-Brooks	May-12	Excellent	Apr-12	Excellent
O-1900	2	250	NG/Oil	W	FT	Cleaver-Brooks	May-12	Fair	Apr-12	Excellent
O-1900	3	250	Oil	W	FT	Cleaver-Brooks	Jun-12	Fair	Apr-12	Excellent
W-3593	1	170	NG	W	FT	Hurst	Apr-12	Excellent	Mar-12	Excellent
W-3593	2	170	NG	W	FT	Hurst	May-12	Excellent	Jun-12	Excellent
Fort Campbell, KY 42223										
650	1	500	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	May-12	Fair
650	2	400	NG/Oil	S	FT	Cleaver-Brooks	May-12	Unacceptable	May-12	Unacceptable
650	3	400	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	May-12	Excellent
3213	1	100	NG/Oil	S	FT	Hurst	May-12	Poor	May-12	Excellent
3213	2	100	NG/Oil	S	FT	Hurst	May-12	Poor	May-12	Unacceptable
3213	3	100	NG/Oil	S	FT	Hurst	May-12	Poor	May-12	Unacceptable
3214	1	100	NG	S	FT	Burnham	May-12	Fair	May-12	Poor

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
3214	2	100	NG	S	FT	Burnham	May-12	Fair	May-12	Unacceptable
3214	3	100	NG	S	FT	Burnham	May-12	Unacceptable	May-12	Unacceptable
6732	1	100	NG/Oil	S	FT	Burnham	May-12	Unacceptable	May-12	Unacceptable
6732	2	100	NG/Oil	S	FT	Burnham	May-12	Unacceptable	May-12	Unacceptable
6732	3	100	NG/Oil	S	FT	Burnham	May-12	Unacceptable	May-12	Unacceptable
6929	1	100	NG/Oil	S	FT	Hurst	May-12	Excellent	May-12	Excellent
6929	2	100	NG/Oil	S	FT	Hurst	May-12	Excellent	May-12	Excellent
6929	3	100	NG/Oil	S	FT	Hurst	May-12	Fair	May-12	Excellent
7005	1	30	NG	S	FT	Allied	May-12	Fair	May-12	Excellent
7042	1	30	NG	S	FT	Allied	May-12	Unacceptable	May-12	Unacceptable
7049	1	30	NG	S	FT	Allied	May-12	Excellent	May-12	Excellent
Fort Drum, NY 13602										
1240	1	80	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
1240	2	80	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
1750	1	100	NG	W	CI	Weil-McLain	Jun-12	Poor	Mar-12	Excellent
1750	2	100	NG	W	CI	Weil-McLain	Jun-12	Fair	Mar-12	Fair
2060	1	150	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2060	2	100	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2065	1	30	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2065	2	30	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2070	1	250	NG	W	FT	Highlander	Jun-12	Poor	Mar-12	Fair
2070	2	250	NG	W	FT	Highlander	Jun-12	Poor	Mar-12	Fair

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
2072	1	100	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2072	2	100	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2074	1	80	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
2074	2	80	NG	W	CI	Weil-McLain	Jun-12	Excellent	Mar-12	Excellent
4530	1	160	NG	W	WT	Bryan	Jun-12	Excellent	Mar-12	Excellent
4530	2	160	NG	W	WT	Bryan	Jun-12	Excellent	Mar-12	Excellent
4530	3	160	NG	W	WT	Bryan	Jun-12	Excellent	Mar-12	Excellent
4530	4	160	NG	W	WT	Bryan	Jun-12	Excellent	Mar-12	Excellent
21510	1	55	NG	W	CI	HydroTherm	none		Mar-12	Unacceptable
21510	2	55	NG	W	CI	HydroTherm	none		Mar-12	Unacceptable
21510	3	55	NG	W	CI	HydroTherm	none		Mar-12	Unacceptable
21510	4	55	NG	W	CI	HydroTherm	none		Mar-12	Unacceptable
Fort Gordon, GA 30905										
310	1	400	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Fair	Oct-11	Fair
310	2	400	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Oct-11	Excellent
310	3	400	NG/Oil	S	FT	Cleaver-Brooks	Oct-11	Fair	Jun-12	Poor
322	1	50	NG/Oil	W	FT	Burnham	none		none	
14600	1	25	NG/Oil	W	FT	Aldrich	Oct-11	Unacceptable	none	
14603	1	100	NG	W	FT	Hurst	none		Oct-11	Fair
14603	2	100	NG	W	FT	Hurst	none		Oct-11	Fair
21610	1	20	NG/Oil	W	FT	Hurst	none		Oct-11	Unacceptable
24414	1	40	NG	S	WT	Parker	Oct-11	Poor	Jun-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
25501	1	15	NG/Oil	W	FT	Kewanee	none		none	
25910	1	1500	NG/Oil	W	WT	IBW	Oct-11	Fair	Jun-12	Excellent
25910	2	1500	NG/Oil	W	WT	IBW	Jun-12	Fair	Oct-11	Excellent
25910	3	1500	NG/Oil	W	WT	IBW	Jun-12	Fair	Oct-11	Excellent
32100	1	60	NG	S	FT	Kewanee	none		Oct-11	Unacceptable
33500	1	25	NG/Oil	W	CI	Crane	none		Oct-11	Unacceptable
35200	1	60	NG	S	WT	Bryan	Oct-11	Unacceptable	none	
36708	1	40	NG	S	FT	Spencer	none		Oct-11	Poor
Hunter Army Airfield, GA 31405										
312	1	125	Oil/NG	W	FT	Burnham	Apr-12	Excellent	Oct-11	Excellent
312	2	125	Oil/NG	W	FT	Burnham	Oct-11	Excellent	Apr-12	Excellent
812	2	150	Oil/NG	S	FT	Hurst	Apr-12	Excellent	Oct-11	Excellent
1024	1	50	Oil	S	FT	Hurst	none		Oct-11	Excellent
1032	1	75	Oil	S	FT	Hurst	none		Oct-11	Excellent
1323	1	300	Oil/NG	W	WT	Flo-Kontrold	none		Oct-11	Excellent
1323	2	300	Oil/NG	W	WT	Flo-Kontrold	Oct-11	Excellent	none	
1323	3	550	Oil/NG	W	WT	Unilux	none		Oct-11	Excellent
Fort Jackson, SC 29207										
1875	1	60	NG	S	WT	Parker	Apr-12	Poor	Apr-12	Unacceptable
2260	1	30	NG	S	WT	Parker	Apr-12	Fair	Apr-12	Fair
3210	1	40	NG	S	FT	Hurst	Apr-12	Unacceptable	Apr-12	Unacceptable
4210	1	30	NG	S	FT	Donlee	Apr-12	Poor	Apr-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
5422	1	25	NG	S	FT	Donlee	Apr-12	Poor	Apr-12	Fair
5422	2	25	NG	S	FT	Donlee	Apr-12	Poor	Apr-12	Fair
5482	1	25	NG	S	FT	Donlee	Apr-12	Fair	Apr-12	Fair
5482	2	25	NG	S	FT	Donlee	Apr-12	Poor	Apr-12	Unacceptable
Fort Knox, KY 40121										
860	1	250	NG/Oil	S	WT	Cleaver-Brooks	May-12	Unacceptable	Oct-11	Excellent
860	2	250	NG/Oil	S	WT	Cleaver-Brooks	May-12	Poor	Oct-11	Excellent
860	3	250	NG/Oil	S	WT	Cleaver-Brooks	Oct-11	Poor	May-12	Excellent
860	4	250	NG/Oil	S	WT	Cleaver-Brooks	Oct-11	Poor	May-12	Unacceptable
6569	2	20	NG	S	FT	Fulton	none		none	
6607	1	125	NG	S	FT	Cleaver-Brooks	none		none	
Letterkenny Army Depot, Chambersburg, PA 17201										
37	1	40	Oil	S	FT	York Shipley	Jun-12	Excellent	Nov-11	Excellent
37	2	80	Oil	S	FT	York Shipley	Nov-11	Excellent	Jun-12	Excellent
320	1	50	NG/Oil	S	FT	York Shipley	Nov-11	Excellent	Jun-12	Excellent
349	1	1200	NG/Oil	S	WT	Nebraska	Nov-11	Unacceptable	Jun-12	Fair
349	2	1200	NG/Oil	S	WT	Nebraska	Jun-12	Excellent	Nov-11	Unacceptable
349	3	700	NG/Oil	S	FT	Cleaver-Brooks	none		Nov-11	Excellent
349	3	700	NG/Oil	S	FT	Cleaver-Brooks	none		Jun-12	Excellent
2360	1	100	Oil	S	FT	York Shipley	Jun-12	Fair	Nov-11	Excellent
2360	2	100	Oil	S	FT	York Shipley	Jun-12	Excellent	Nov-11	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
Fort McPherson, GA 30330										
160	1	300	NG/Propane	S	FT	Cleaver-Brooks	Aug-12	Fair	none	
160	2	300	NG/Propane	S	FT	Cleaver-Brooks	Aug-12	Excellent	none	
Milan Army Ammunition Plant, Milan, TN 38358										
A15	1	250	Oil	S	FT	Cleaver-Brooks	Oct-11	Excellent	May-12	Excellent
A15	2	250	Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Oct-11	Excellent
B21	1	250	Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Oct-11	Excellent
B21	2	250	Oil	S	FT	Cleaver-Brooks	Oct-11	Excellent	May-12	Excellent
D88	1	350	Oil	S	FT	Cleaver-Brooks	May-12	Poor	Oct-11	Excellent
D88	2	350	Oil	S	FT	Cleaver-Brooks	Oct-11	Excellent	May-12	Excellent
J107	1	200	Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Oct-11	Excellent
J107	2	200	Oil	S	FT	Cleaver-Brooks	Oct-11	Poor	May-12	Excellent
X21	1	200	Oil	S	FT	Cleaver-Brooks	Oct-11	Excellent	May-12	Excellent
X21	2	300	Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Oct-11	Excellent
X21	3	300	Oil	S	FT	Cleaver-Brooks	Oct-11	Excellent	May-12	Excellent
Fort Myer, VA 22211										
447	1	750	NG	S	FT	Cleaver-Brooks	none		Mar-12	Excellent
447	2	750	NG	S	FT	Cleaver-Brooks	none		Mar-12	Unacceptable
Redstone Arsenal, Huntsville, AL 35808										
115	1	50	NG/Oil	S	FT	Hurst	Apr-12	Poor	Nov-11	Unacceptable
115	2	100	NG/Oil	S	FT	Hurst	Nov-11	Excellent	Apr-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
3443	1	100	Oil	S	WT	Cleaver-Brooks	Apr-12	Excellent	Nov-11	Excellent
3775	1	100	NG	S	FT	PVI	none		Apr-12	Unacceptable
5540	1	150	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Excellent	Nov-11	Excellent
7105	1	250	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Excellent	Nov-11	Excellent
7105	2	250	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Fair	Apr-12	Excellent
7153	1	150	NG	S	FT	Cleaver-Brooks	Nov-11	Poor	Apr-12	Excellent
7153	2	250	NG	S	FT	Cleaver-Brooks	Apr-12	Fair	none	
7291	1	250	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Poor	Nov-11	Excellent
7291	2	80	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Excellent	Apr-12	Excellent
7549	1	80	NG	S	FT	Cleaver-Brooks	Apr-12	Excellent	none	
7549	2	50	NG	S	WT	Cleaver-Brooks	Nov-11	Poor	Apr-12	Excellent
7668	1	600	NG	S	FT	Kewanee	Apr-12	Poor	Nov-11	Excellent
7668	2	250	NG	S	FT	Kewanee	Nov-11	Excellent	Apr-12	Unacceptable
7668	3	250	NG	S	FT	Cleaver-Brooks	Nov-11	Excellent	Apr-12	Excellent
7668	4	400	NG	S	FT	Cleaver-Brooks	Apr-12	Excellent	none	
7855	1	150	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Poor	Apr-12	Excellent
7855	2	150	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Fair	Nov-11	Excellent
8028	1	80	Oil	S	FT	Cleaver-Brooks	Apr-12	Fair	Nov-11	Excellent
8028	2	80	Oil	S	FT	Cleaver-Brooks	none		Apr-12	Excellent
8874	1	60	Oil	S	FT	Cleaver-Brooks	Nov-11	Excellent	Apr-12	Unacceptable
8874	2	60	Oil	S	FT	Cleaver-Brooks	Apr-12	Excellent	Nov-11	Unacceptable
8977	1	150	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Fair	Apr-12	Excellent
8977	2	100	NG/Oil	S	FT	Cleaver-Brooks	Apr-12	Excellent	Nov-11	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
Portable	1	60	Oil	S	FT	Cleaver-Brooks	none		Apr-12	Fair
Portable	2	60	Oil	S	FT	Cleaver-Brooks	none		Apr-12	Fair
Portable	3	100	Oil/NG	S	FT	Cleaver-Brooks	Apr-12	Excellent	none	
Portable	4	100	Oil/NG	S	FT	Cleaver-Brooks	Apr-12	Poor	Nov-11	Fair
Fort Rucker, AL 36362										
301	1	60	NG/Oil	S	FT	Cleaver-Brooks	none		none	
301	2	60	NG/Oil	S	FT	Cleaver-Brooks	none		none	
301	3	125	NG/Oil	S	FT	Cleaver-Brooks	May-12	Unacceptable	Jan-12	Poor
301	4	125	NG/Oil	S	FT	Cleaver-Brooks	May-12	Poor	Jan-12	Unacceptable
4701	1	250	NG/Oil	S	FT	Hurst	May-12	Fair	Jan-12	Excellent
4701	2	250	NG/Oil	S	FT	Hurst	May-12	Fair	Jan-12	Excellent
Fort Stewart, GA 31314										
350	1	330	NG/Oil	W	WT	Fulton	none		Oct-11	Excellent
350	2	180	NG	S	WT	Unilux	Oct-11	Excellent	none	
1412	1	1500	Oil/NG	S	WT	English	none		none	
1412	2	1500	Oil/NG	S	WT	English	Apr-12	Excellent	Oct-11	Excellent
1412	3	1500	Oil/NG	S	WT	English	Oct-11	Fair	none	
1412	4	2850	Wood/Oil	S	WT	Keeler	Oct-11	Fair	Apr-12	Poor
Watervliet Arsenal, Watervliet, NY 12189										
35	1	600	NG	S	FT	Cleaver-Brooks	Mar-12	Excellent	Aug-12	Excellent
136	1	2100	NG/Oil	S	WT/FT	Donlee	Aug-12	Excellent	Mar-12	Unacceptable
136	3	3000	NG/Oil	S	WT	Union Iron Works	Aug-12	Excellent	Mar-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
136	4	3000	Oil	S	WT	Union Iron Works	Aug-12	Excellent	Mar-12	Excellent
136	5	750	NG/Oil	S	WT	Murray	Aug-12	Excellent	Mar-12	Excellent
West Point Military Reservation, West Point, NY 10996										
604	1	3334	NG/Oil	S	WT	Babc. & Wilc.	none		Dec-11	Unacceptable
604	2	3334	NG/Oil	S	WT	Babc. & Wilc.	none		Dec-11	Unacceptable
604	3	1867	NG/Oil	S	WT	Tampella Power	Dec-11	Poor	none	
687	1	30	NG	S	FT	Hurst	Dec-11	Excellent	none	
687	2	30	NG	S	FT	Kewanee	Dec-11	Excellent	none	
845	1	1067	NG/Oil	S	WT	Bigelow	none		Dec-11	Unacceptable
845	2	1067	NG/Oil	S	WT	Bigelow	Dec-11	Unacceptable	none	
CENTRAL REGION										
Fort Carson, CO 80913										
1860	1	1200	NG/Oil	W	WT	Union Iron Works	Aug-12	Excellent	Feb-12	Excellent
1860	2	1200	NG/Oil	W	WT	English	none		none	
1860	3	750	NG/Oil	W	WT	IBW	Feb-12	Excellent	Aug-12	Excellent
7504	1	600	NG/Oil	W	WT	IBW	Feb-12	Excellent	Aug-12	Excellent
7504	2	600	NG/Oil	W	WT	IBW	Aug-12	Excellent	Feb-12	Unacceptable
9609	1	175	NG/Oil	S	FT	Burnham	Aug-12	Excellent	Feb-12	Excellent
9609	2	175	NG/Oil	S	FT	Burnham	Feb-12	Excellent	Aug-12	Excellent
9609	3	175	NG/Oil	S	FT	Burnham	Aug-12	Excellent	Feb-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
Hawthorne Army Depot, Hawthorne, NV 89415										
13	1	500	Oil	S	WT	Nebraska	Jun-12	Excellent	Mar-12	Excellent
13	2	500	Oil	S	WT	Nebraska	Jun-12	Excellent	Mar-12	Excellent
49-31	8	80	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Mar-12	Excellent
102-52	6	100	Oil	S	WT	Volcano	Jun-12	Excellent	Mar-12	Excellent
103-6	25	500	Oil	S	WT	Nebraska	Jun-12	Excellent	Mar-12	Excellent
103-6	26	500	Oil	S	WT	Nebraska	Jun-12	Excellent	none	
104-2	29	150	Oil	S	WT	Cleaver-Brooks	Jun-12	Fair	Mar-12	Excellent
104-4	7	100	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Mar-12	Excellent
104-9	3	60	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Mar-12	Excellent
117-2	4	400	Oil	S	FT	Cleaver-Brooks	Mar-12	Fair	none	
117-2	5	400	Oil	S	FT	Cleaver-Brooks	Jun-12	Excellent	Mar-12	Excellent
Fort Hood, TX 76544										
23001	1	125	NG	S	FT	Donlee	none		Aug-12	Excellent
23001	2	125	NG	S	FT	Donlee	Aug-12	Fair	Jun-12	Excellent
29005	1	130	NG	W	FT	Hurst	none		Jun-12	Unacceptable
29005	2	130	NG	W	FT	Hurst	none		Jun-12	Unacceptable
29005	3	130	NG	W	FT	Hurst	none		Jun-12	Unacceptable
29005	4	130	NG	W	FT	Hurst	none		Jun-12	Unacceptable
36000	1	250	NG/Oil	S	FT	Cleaver-Brooks	none		Jun-12	Unacceptable
36000	2	250	NG/Oil	S	FT	Cleaver-Brooks	Jun-12	Unacceptable	Jul-12	Unacceptable
36000	3	250	NG/Oil	S	FT	Cleaver-Brooks	Jul-12	Unacceptable	Jun-12	Unacceptable

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
39015	1	150	NG	S	FT	Burnham	Aug-12	Unacceptable	Jun-12	Unacceptable
39015	2	150	NG	S	FT	Burnham	Jun-12	Unacceptable	Aug-12	Excellent
39015	3	150	NG	S	FT	Burnham	Aug-12	Unacceptable	Jun-12	Unacceptable
Fort Huachuca, AZ 85613										
11640	1	35	NG	W	FT	Kewanee	Aug-12	Excellent	Jan-12	Excellent
22528	1	150	NG	S	FT	York Shipley	Aug-12	Excellent	Jan-12	Excellent
31122	1	75	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
31122	2	75	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
43084	1	25	NG	W	WT	Ajax	none		none	
43086	1	25	NG	W	WT	Ace Buehler	none		none	
45001	1	250	NG	S	FT	Cleaver-Brooks	none		Jan-12	Excellent
45001	2	250	NG	S	FT	Cleaver-Brooks	Jan-12	Excellent	none	
45005	1	50	NG	W	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
45006	1	25	NG	W	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
51005	1	150	NG	W	FT	Superior	Aug-12	Excellent	Jan-12	Excellent
51005	2	150	NG	W	FT	Superior	Aug-12	Excellent	Jan-12	Excellent
52104	1	80	NG	S	FT	York Shipley	Aug-12	Excellent	Jan-12	Excellent
52107	1	80	NG	S	FT	York Shipley	Jan-12	Unacceptable	Aug-12	Excellent
52107	2	80	NG	S	FT	Continental	Aug-12	Excellent	Jan-12	Unacceptable
52111	1	15	NG	W	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
52120	1	15	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
52302	3	300	NG	W	FT	Kewanee	Aug-12	Excellent	Jan-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
53301	1	25	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
53302	1	25	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
53320	1	30	NG	W	FT	Lochinvar	none		none	
55350	1	45	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
61801	1	250	NG	W	FT	Donlee	Aug-12	Excellent	Jan-12	Excellent
61801	2	250	NG	W	FT	Donlee	Aug-12	Poor	Jan-12	Excellent
62701	1	400	NG	W	FT	Kewanee	Aug-12	Excellent	Jan-12	Excellent
62701	2	400	NG	W	FT	Kewanee	Aug-12	Excellent	none	
63845	1	40	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
68056	1	30	NG	S	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
71810	1	25	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
81504	1	300	NG	W	FT	Superior	Aug-12	Unacceptable	none	
81504	2	400	NG	W	FT	Superior	Aug-12	Unacceptable	Jan-12	Excellent
82301	1	50	NG	W	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
85846	1	15	NG	W	WT	Ajax	Aug-12	Excellent	Jan-12	Excellent
91110	1	80	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
91114	1	80	NG	W	WT	Rite	Aug-12	Excellent	Jan-12	Excellent
<i>Iowa Army Ammunition Plant, Middletown, IA 52638</i>										
I-62	5	3700	NG	S	WT	Keystone	Apr-12	Unacceptable	none	
500-139	1	3000	Coal	S	WT	Zurn	none		Apr-12	Excellent
500-139	2	3000	Coal	S	WT	Zurn	none		Apr-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
Fort Irwin, CA 92310										
166	1	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
166	2	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
166	3	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
166	4	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
254	1	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
254	2	10	Propane	S	WT	Parker	Apr-12	Excellent	Apr-12	Excellent
271	1	10	Propane	S	WT	ThermoSteam	Apr-12	Excellent	Apr-12	Excellent
Lake City Army Ammunition Plant, Independence, MO 64051										
15	1	2250	NG/Oil	S	WT	Babc. & Wilc.	none		Jan-12	Excellent
15	2	2250	NG/Oil	S	WT	Babc. & Wilc.	none		Mar-12	Excellent
15	3	2250	NG/Oil	S	WT	Babc. & Wilc.	none		Jan-12	Fair
15	4	2400	NG/Oil	S	WT	Nebraska	none		Jan-12	Fair
15	5	800	NG/Oil	S	FT	Superior	Jan-12	Fair	none	
Lima Army Tank Plant, Lima, OH 45804										
142	4	1500	Coal	S	WT	Combust. Engin.	Jun-12	Excellent	Feb-12	Excellent
142	5	2250	Coal	S	WT	Keeler	Jun-12	Excellent	Feb-12	Excellent
142	6	1500	Coal	S	WT	Keeler	Jun-12	Fair	Feb-12	Excellent
142	7	1800	NG	S	WT	Volcano	Feb-12	Excellent	Jun-12	Excellent
McAlester Army Ammunition Plant, McAlester, OK 74501										
105-B	1	250	NG/Oil	S	FT	York Shipley	Jul-12	Excellent	Dec-11	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
105-B	2	250	NG/Oil	S	FT	York Shipley	May-12	Excellent	Dec-11	Excellent
110-B	1	150	NG/Oil	S	FT	York Shipley	May-12	Excellent	Dec-11	Excellent
110-B	2	150	NG/Oil	S	FT	York Shipley	Jul-12	Excellent	Dec-11	Excellent
129-B	1	350	NG/Oil	S	FT	Kewanee	May-12	Excellent	Dec-11	Excellent
129-B	2	250	NG/Oil	S	FT	Kewanee	Jul-12	Excellent	Dec-11	Excellent
136-B	1	250	NG/Oil	S	FT	Kewanee	none		Dec-11	Excellent
136-B	2	250	NG/Oil	S	FT	Kewanee	none		Dec-11	Excellent
141-B	1	100	NG/Oil	S	FT	York Shipley	May-12	Excellent	Dec-11	Excellent
141-B	2	100	NG/Oil	S	FT	York Shipley	Jul-12	Excellent	Dec-11	Excellent
165-B	1	250	NG/Oil	S	FT	Cleaver-Brooks	Jul-12	Excellent	Dec-11	Excellent
165-B	2	250	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Dec-11	Excellent
185-B	1	350	NG/Oil	S	FT	Cleaver-Brooks	May-12	Fair	Dec-11	Excellent
185-B	2	350	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Dec-11	Excellent
185-B	3	350	NG/Oil	S	FT	Cleaver-Brooks	none		none	
185-B	4	350	NG/Oil	S	FT	Kewanee	Jul-12	Excellent	Dec-11	Excellent
185-B	5	500	NG/Oil	S	FT	Kewanee	none		Dec-11	Excellent
185-B	6	500	NG/Oil	S	FT	Kewanee	Jul-12	Excellent	Dec-11	Excellent
229-B	1	250	NG/Oil	S	FT	York Shipley	Jul-12	Fair	Dec-11	Excellent
229-B	2	250	NG/Oil	S	FT	York Shipley	May-12	Excellent	Dec-11	Excellent
759	1	30	NG/Oil	S	FT	Williams & Davis	May-12	Excellent	Dec-11	Excellent
759	2	30	NG/Oil	S	FT	Williams & Davis	Jul-12	Fair	Dec-11	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
Fort Polk, LA 71459										
3539	1	40	NG	S	FT	Cleaver-Brooks	May-12	Excellent	Apr-12	Excellent
4386	1	80	NG	S	FT	Superior	Apr-12	Excellent	May-12	Excellent
4386	2	80	NG	S	FT	Superior	May-12	Excellent	Apr-12	Excellent
Red River Army Depot, Texarkana, TX 75507										
336	1	1500	Coal/Wood	S	WT	Vogt	Aug-12	Fair	Apr-12	Excellent
336	2	1500	Coal/Wood	S	WT	Vogt	Apr-12	Fair	Aug-12	Excellent
336	3	1500	Coal/Wood	S	WT	Vogt	none		Apr-12	Excellent
1142	1	250	NG	S	FT	Cleaver-Brooks	Aug-12	Unacceptable	Apr-12	Unacceptable
1142	2	250	NG	S	FT	Cleaver-Brooks	Aug-12	Unacceptable	Apr-12	Unacceptable
Fort Riley, KS 66442										
615	1	1000	NG/Oil	S	WT	Babc. & Wilc.	Aug-12	Excellent	Mar-12	Excellent
615	2	1000	NG/Oil	S	WT	Babc. & Wilc.	Mar-12	Fair	Aug-12	Excellent
Fort Sill, OK 73503										
2812	1	150	NG	W	FT	Cleaver-Brooks	Jul-12	Excellent	Feb-12	Excellent
2812	2	150	NG	W	FT	Cleaver-Brooks	Jul-12	Excellent	Feb-12	Excellent
3700	1	100	NG	W	FT	Ajax	Jul-12	Fair	Feb-12	Excellent
3700	2	80	NG	W	FT	Ajax	Jul-12	Excellent	Feb-12	Excellent
3709	1	80	NG	W	FT	Ajax	Jul-12	Excellent	Feb-12	Excellent
3709	2	80	NG	W	FT	Ajax	Jul-12	Excellent	Feb-12	Excellent
4701	1	75	NG	W	FT	Cleaver-Brooks	Jul-12	Excellent	Feb-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
4701	2	75	NG	W	FT	Cleaver-Brooks	Jul-12	Excellent	Feb-12	Excellent
4915	1	150	NG	S	FT	Rite	Jul-12	Excellent	Feb-12	Excellent
6003	1	400	NG/Oil	S	FT	Kewanee	Jul-12	Excellent	Feb-12	Excellent
6003	2	300	NG/Oil	S	FT	Kewanee	Jul-12	Excellent	Feb-12	Excellent
6003	3	200	NG/Oil	S	FT	Kewanee	Feb-12	Excellent	Jul-12	Excellent
Tooele Army Depot, Tooele, UT 84074										
1400	1	115	Oil	S	WT	Parker	none		none	
White Sands Missile Range, NM 88002										
1549	1	150	NG/Oil	S	FT	Cleaver-Brooks	May-12	Excellent	Nov-11	Excellent
1549	2	150	NG/Oil	S	FT	Cleaver-Brooks	Nov-11	Excellent	May-12	Excellent
Yuma Proving Ground, AZ 85365										
3566	A	21	Oil	S	WT	Bryan	Jun-12	Excellent	Jan-12	Excellent
3566	B	21	Oil	S	WT	Bryan	Jan-12	Excellent	Jun-12	Excellent
PACIFIC REGION										
Fort Greely MDA, Delta Junction, AK 99737										
3102	1	190	Oil	W	WT	Bryan	May-12	Excellent	none	
3102	2	190	Oil	W	WT	Bryan	May-12	Excellent	none	
3102	3	190	Oil	W	WT	Bryan	none		May-12	Excellent
Schofield Barracks, Oahu, HI 96786										
2802	2	350	Oil	S	FT	Cleaver-Brooks	Feb-12	Poor	Jul-12	Fair

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
KOREA										
Camp Carroll, Waegwan, Chilkok County, North Gyeongsang Province										
233	1	125	NG/Oil	S	FT	Burnham	none		Mar-12	Excellent
233	2	125	NG/Oil	S	FT	Burnham	none		Mar-12	Poor
326	1	240	Oil	S	FT	Daelim	none		Mar-12	Excellent
346	1	125	NG/Oil	S	FT	Powerwell	none		Mar-12	Unacceptable
666	1	150	NG	S	FT	Burnham	none		Mar-12	Poor
666	2	150	NG	S	FT	Burnham	none		Mar-12	Unacceptable
666	3	40	NG	S	FT	Burnham	none		Mar-12	Unacceptable
Camp Humphreys, Pyeongtaek										
757	1	400	Oil	S	FT	Hurst	none		Mar-12	Satisfactory
757	2	400	Oil	S	FT	Samyang	none		Mar-12	Unacceptable
757	3	400	Oil	S	FT	Samyang	none		Mar-12	Unacceptable
Yongsan Garrison, Seoul										
1533	1	100	NG	S	FT	Burnham	none		Mar-12	Unacceptable
1922	1	125	Oil	S	FT	York Shipley	Mar-12	Unacceptble	none	
1922	2	125	Oil	S	FT	York Shipley	Mar-12	Unacceptble	none	
2392	1	250	NG	S	FT	York Shipley	none		Feb-12	Excellent
2392	2	250	NG	S	FT	York Shipley	none		Feb-12	Excellent
2392	3	250	NG	S	FT	York Shipley	none		Feb-12	Excellent
2392	4	250	NG	S	FT	York Shipley	none		Feb-12	Excellent

Building No. (Boiler Location)	Boiler No.	Boiler Horse-power	Fuel (Nat. Gas, Fuel Oil, Coal, Propane, etc.)	Working Fluid (Steam or Water)	Boiler Construction (Firetube, Watertube, or Cast Iron)	Boiler Manufacturer	"A" Internal/External Inspection		"C" Operating Inspection	
							Month/Year	Boiler Rating	Month/Year	Boiler Rating
2392	5	250	NG	S	FT	York Shipley	none		Feb-12	Excellent
2700	1	300	NG	S	FT	York Shipley	none		Feb-12	Fair
2700	2	300	NG	S	FT	York Shipley	none		Feb-12	Excellent
2700	3	300	NG	S	FT	York Shipley	none		Feb-12	Excellent
2700	4	300	NG	S	FT	York Shipley	none		Feb-12	Excellent
2700	5	300	NG	S	FT	York Shipley	none		Feb-12	Excellent
4050	1	125	Oil	S	FT	Cleaver-Brooks	none		Mar-12	Excellent
4050	2	125	Oil	S	FT	Cleaver-Brooks	none		Mar-12	Excellent
4050	3	200	Oil	W	FT	Cleaver-Brooks	none		Mar-12	Excellent
4050	4	200	Oil	W	FT	Cleaver-Brooks	none		Mar-12	Excellent
4050	5	25	NG	W	FT	Aldrich	none		Mar-12	Excellent
4050	6	25	NG	W	FT	Aldrich	none		Mar-12	Excellent
5276	1	250	NG	S	FT	Burnham	none		Mar-12	Excellent
5276	2	250	NG	S	FT	Burnham	none		Mar-12	Excellent
5276	3	250	NG	S	FT	Burnham	none		Mar-12	Excellent
5459	1	250	NG	S	FT	York Shipley	none		Feb-12	Excellent
5459	2	125	NG	S	FT	York Shipley	none		Feb-12	Excellent
5459	3	125	NG	S	FT	York Shipley	none		Feb-12	Excellent
9923	1	150	Oil	S	FT	Hurst	none		none	
FED-P77	1	200	Oil	S	FT	Hurst	none		Mar-12	Fair
FED-P77	2	125	Oil	S	FT	Hurst	none		Mar-12	Excellent

Appendix B: Ordering Supplies or Services

ORDER FOR SUPPLIES OR SERVICES										PAGE 1 OF 22			
1. CONTRACT/PURCH. ORDER/ AGREEMENT NO. W9132T-10-D-0007			2. DELIVERY ORDER/ CALL NO. 0020		3. DATE OF ORDER/CALL (YYYYMMDD) 2011 Sep 13		4. REQ./ PURCH. REQUEST NO. W81EWF11030521			5. PRIORITY			
6. ISSUED BY ERDC CONTRACTING OFFICE CHAMPAIGN OFFICE P O BOX 9005 CHAMPAIGN IL 61826-9005			CODE W9132T		7. ADMINISTERED BY (if other than 6) SEE ITEM 6				8. DELIVERY FOB <input checked="" type="checkbox"/> DESTINATION <input type="checkbox"/> OTHER (See Schedule if other)				
9. CONTRACTOR MEC DEVELOPMENT, LLC NAME MR FRANK DRISCOLL AND 312 MAIN ST STE 400 ADDRESS NEW TOWN ND 58763-4001			CODE 4B9E5		FACILITY 4B9E5		10. DELIVER TO FOB POINT BY (Date) (YYYYMMDD) SEE SCHEDULE			11. MARK IF BUSINESS IS <input type="checkbox"/> SMALL <input type="checkbox"/> SMALL DISADVANTAGED <input type="checkbox"/> WOMEN-OWNED			
12. DISCOUNT TERMS Net 30 Days							13. MAIL INVOICES TO THE ADDRESS IN BLOCK See Item 14						
14. SHIP TO SEE SCHEDULE			CODE		15. PAYMENT WILL BE MADE BY PR W1J5 USACE FIN CTR 5722 INTEGRITY DRIVE BUILDING 787 MILLINGTON TN 38054-5005			CODE W916TX		MARK ALL PACKAGES AND PAPERS WITH IDENTIFICATION NUMBERS IN BLOCKS 1 AND 2.			
16. TYPE OF ORDER		DELIVERY/ CALL		<input checked="" type="checkbox"/> This delivery order/call is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.									
		PURCHASE		Reference your quote dated Furnish the following on terms specified herein. REF:									
ACCEPTANCE. THE CONTRACTOR HEREBY ACCEPTS THE OFFER REPRESENTED BY THE NUMBERED PURCHASE ORDER AS IT MAY PREVIOUSLY HAVE BEEN OR IS NOW MODIFIED, SUBJECT TO ALL OF THE TERMS AND CONDITIONS SET FORTH, AND AGREES TO PERFORM THE SAME.													
NAME OF CONTRACTOR			SIGNATURE			TYPED NAME AND TITLE			DATE SIGNED (YYYYMMDD)				
<input type="checkbox"/> If this box is marked, supplier must sign Acceptance and return the following number of copies:													
17. ACCOUNTING AND APPROPRIATION DATA/ LOCAL USE See Schedule													
18. ITEM NO.		19. SCHEDULE OF SUPPLIES/ SERVICES				20. QUANTITY ORDERED/ ACCEPTED*		21. UNIT		22. UNIT PRICE		23. AMOUNT	
		SEE SCHEDULE											
* If quantity accepted by the Government is same as quantity ordered, indicate by X. If different, enter actual quantity accepted below quantity ordered and encircle.						24. UNITED STATES OF AMERICA TEL: 217-373-6748 EMAIL: g-denman@cecer.army.mil BY: GREGORY E DENMAN			25. TOTAL \$333,424.00		26. DIFFERENCES		
27a. QUANTITY IN COLUMN 20 HAS BEEN <input type="checkbox"/> INSPECTED <input type="checkbox"/> RECEIVED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED													
b. SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE						c. DATE (YYYYMMDD)		d. PRINTED NAME AND TITLE OF AUTHORIZED GOVERNMENT REPRESENTATIVE					
e. MAILING ADDRESS OF AUTHORIZED GOVERNMENT REPRESENTATIVE						28. SHIP NO.		29. DO VOUCHER NO.		30. INITIALS			
f. TELEPHONE NUMBER			g. E-MAIL ADDRESS			<input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		32. PAID BY		33. AMOUNT VERIFIED CORRECT FOR			
36. I certify this account is correct and proper for payment.						31. PAYMENT <input type="checkbox"/> COMPLETE <input type="checkbox"/> PARTIAL <input type="checkbox"/> FINAL		34. CHECK NUMBER					
a. DATE (YYYYMMDD)		b. SIGNATURE AND TITLE OF CERTIFYING OFFICER						35. BILL OF LADING NO.					
37. RECEIVED AT		38. RECEIVED BY		39. DATE RECEIVED (YYYYMMDD)		40. TOTAL CONTAINERS		41. S/R ACCOUNT NO.		42. S/R VOUCHER NO.			

Section B - Supplies or Services and Prices

Proposal information

a. Minimum Acceptance Period:

The Government requires a minimum acceptance period of ninety (90) calendar days.

“Acceptance period” means the number of calendar days available to the Government for awarding a task order from the date specified in this RFQ for receipt of proposal (Block 10).

The Contractor agrees to execute all that it has undertaken to do, in compliance with its proposal (including any and all subcontractor costs) if that proposal is accepted in writing within the acceptance period stated above.

b. **Basic IDIQ Foreign Clauses:** Reference the basic Indefinite Delivery/Indefinite Quantity (IDIQ) Contract W9132T-10-D-0007 for clauses specific to performance in a foreign country.

c. **Wage Determinations:** Appropriate wage determinations that are not already in the basic contract shall be obtained at <http://www.wdol.gov>.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001		247,632	Dollars, US	\$1.00	\$247,632.00 NTE
	ASSESSMENT OF BOILERS FFP Provide services inclusive of all supervision, labor, supplies, materials, equipment, facilities, travel and per diem necessary to Provide Assessment/Inspection of Boilers at Army Installations in accordance with the attached Statement of Work. Accounting for Contractor Services Not Separately Priced. The Inspection Unit Price shall be a firm, fixed price. Quantity of Inspections is estimated Not To Exceed 804. INSPECTION UNIT PRICE: \$308.00 UNIT PRICE SHALL BE PER INSPECTION REGARDLESS OF "A" OR "C" TYPE INSPECTION OR LOCATION. (Travel expenses shall not be included in this line item; reference Line Item 0003.) THIS LINE ITEM SHALL BE SHOWN SEPARATELY ON THE INVOICE. FOB: Destination MILSTRIP: W81EWF11030521 PURCHASE REQUEST NUMBER: W81EWF11030521				
				NET AMT	\$247,632.00
	ACRN AA CIN: W81EWF110305210001				\$247,632.00

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0002		45,792	Dollars, US	\$1.00	\$45,792.00 NTE
	BOILER EFFICIENCY & EMISSIONS TESTS FFP Provide services inclusive of all supervision, labor, supplies, materials, equipment, and facilities to perform boiler efficiency and emissions tests in accordance with the attached Statement of Work. The following Test Unit Price shall be a firm, fixed price. Estimated Quantity is Not To Exceed 54 tests Test Unit Price: \$848.00 THIS LINE ITEM SHALL BE SHOWN SEPARATELY ON THE INVOICE. FOB: Destination PURCHASE REQUEST NUMBER: W81EWF11030521				
				NET AMT	\$45,792.00
ACRN AA CIN: W81EWF110305210002					\$45,792.00

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT												
0003		40,000	Dollars, US	\$1.00	\$40,000.00 NTE												
	TRAVEL FFP This line item is for the purpose of funding travel to provide for travel expenses according to the following firm unit price per trip by region: <table><tr><td>REGION</td><td>UNIT PRICE PER TRIP</td><td>EST TRIPS</td></tr><tr><td>CONUS</td><td>\$350.00</td><td>80</td></tr><tr><td>PACIFIC</td><td>\$500.00</td><td>6</td></tr><tr><td>KOREA</td><td>\$1000.00</td><td>9</td></tr></table> NUMBER OF TRIPS SHALL NOT EXCEED THE ESTIMATED QUANTITIES NOTED ABOVE WITHOUT PRIOR APPROVAL OF THE CERL COTR AND FUNDS AVAILABILITY. THIS LINE ITEM SHALL BE SHOWN SEPARATELY ON THE INVOICE. IF SEPARATE MONTHLY INVOICES ARE SUBMITTED FOR LINE ITEMS 0001 AND 0002, THIS LINE ITEM MAY BE INVOICED TWICE A MONTH. FOB: Destination PURCHASE REQUEST NUMBER: W81EWF11030521				REGION	UNIT PRICE PER TRIP	EST TRIPS	CONUS	\$350.00	80	PACIFIC	\$500.00	6	KOREA	\$1000.00	9	
REGION	UNIT PRICE PER TRIP	EST TRIPS															
CONUS	\$350.00	80															
PACIFIC	\$500.00	6															
KOREA	\$1000.00	9															
				NET AMT	\$40,000.00												
	ACRN AA CIN: W81EWF110305210003				\$40,000.00												

Section C - Descriptions and Specifications

SOW

The services identified in these specifications shall be completed under Indefinite Delivery Contract W9132T-10-D-0007.

STATEMENT OF WORK

ASSESSMENT OF CORROSION IN BOILERS AT US ARMY INSTALLATIONS

1. **BACKGROUND:** Improper water treatment in boilers can lead to corrosion and scaling of wetted surfaces, thereby reducing both equipment life and operating efficiency. Inspections of boilers address the effects of corrosion and scaling, as well as sooting and improper boiler installation, on the condition of the boilers. Inspections also determine any repairs that are needed to ensure that the boilers will operate safely. Such inspections are required annually at Army installations according to Army Regulation (AR) 420-1, Chapter 23, Section VI, paragraph 23-36. Inspections are performed primarily on “power” boilers, which are steam boilers with safety valve settings over 15 psig, or hot water boilers that operate at pressures over 160 psig or temperatures over 250 °F. Some inspections may be performed on “heating” boilers, those with lower pressure or temperature ratings.

2. **OBJECTIVE:** The work performed under this task order shall provide not more than 804 boiler inspections (referred to in this document as “inspections”) at Army installations in accordance with AR 420-1-23-36. The boiler inspections shall be based on the attached schedule of proposed inspections. This shall include providing recommendations for reducing corrosion and improving the efficiency and dependability of the boilers and associated boiler plant equipment. Inspections shall also include measurement of efficiency and emissions (referred to in this document as “tests”) for not more than 54 boilers based on the attached schedule of proposed inspections.

3. **MAJOR REQUIREMENTS:** The Contractor shall provide boiler inspections and tests based on the attached schedule. In order for the Con-

tractor to accomplish the work under this task order, it shall be necessary for the Contractor to complete the following tasks:

a. Task 1. PROVIDE QUALIFICATIONS OF INSPECTORS: Prior to arranging an inspection visit to an installation, the Contractor shall submit to the Contracting Officer's Technical Representative (COTR) the qualifications of each person who will be performing the inspections. Each Inspector shall be a National Board of Boiler and Pressure Vessel Inspectors (NBBPVI) Commissioned Boiler Inspector. Proof of current NBBPVI commission shall be submitted. Qualifications shall include the Inspector's business address, telephone number, and references for two (2) sites where boilers 200 Boiler Horsepower or larger were previously inspected. The site references shall include the name and telephone number of the site employee responsible for the boilers at the time of the inspections. If the Inspector is a US Federal Government employee at the time of the inspections, the Contractor shall furnish written approval for performing inspections from the Inspector's Ethics Officer.

b. Task 2. ARRANGE INSPECTIONS AND TESTS: For each Army installation on the attached schedule, information is provided on a Point of Contact (POC) and the proposed inspections and tests. A proposed month is listed for each inspection. Tests shall be done when boiler operation above 60 percent capacity is ensured, be that in conjunction with the inspections or separately at another time. The Contractor is responsible for contacting the installation POC and confirming a final schedule. The Contractor shall confirm, in writing, the schedule and a date for the installation visit four (4) weeks prior to the inspection month. A copy of the confirmed schedule shall be sent to the COTR two (2) weeks before the inspection month. The Contractor shall keep the COTR informed of any significant changes in the scheduled inspections, e.g., boilers being decommissioned or out of service. Not more than five (5) working days prior to the visit date, the Contractor shall reconfirm, in writing, with the POC the visit date and that each boiler will be ready and available for its scheduled inspection or test. When reconfirming the visit, the Contractor shall send the installation POC the confirmed schedule listing boilers for that installation only.

Not more than one (1) Type "A" internal/external inspection or more than one (1) type "C" operating inspection shall be performed on a boiler unless the Contractor obtains the written approval of the COTR. Inspection and

testing of boilers shall be scheduled to occur Monday through Friday between the hours of 0700 and 1700 local time, except where other hours are noted in the schedule. No inspections or tests shall be scheduled on weekends or holidays. If an Inspector or Tester wishes to work at other times for his/her own convenience, he/she may do so only if the installation POC agrees to make the boilers available and there is no additional cost to the Government.

c. Task 3. PERFORM INSPECTIONS: Inspections shall be performed according to the final and confirmed inspection schedule from Task 2. The preparation of the boilers for inspections will be at the sole expense and responsibility of the Government. Both Type “A” and “C” inspections shall be performed. The Type “A” is an internal/external inspection with the boiler shut down, cooled, drained, and opened for access to its interior combustion and water spaces. The Inspector shall enter any internal boiler space accessible through a minimum 12 x 16-in. opening by passing completely through the opening. When requested by the installation, the Inspector shall present a Certificate for Confined Space Entry. At the installations noted in the schedule, the Contractor shall provide personnel and equipment to allow the Inspector to enter “confined” boiler spaces. The Type “C” is an external inspection, including controls and safety devices, with the boiler in operation. During a “C” inspection, the safety/relief valves shall be lifted unless the installation prevents the Inspector from doing so and the installation POC signs the waiver box on the inspection form. The installation POC or his/her representative will accompany each Inspector to witness each boiler inspection. If a boiler is not prepared for inspection in compliance with the NBBPVI Inspection Code criteria, that boiler shall not be inspected, the Contractor shall immediately notify the COTR and the installation POC or his/her representative, and the Inspector shall proceed to the next boiler. Payments will not be made for boilers that have been identified as being unprepared/unavailable by the installation POC per Task 2 above. If the Contractor has written documentation from the installation POC within the five (5) day period set forth in Task 2 verifying that a boiler will be ready and available during the installation visit, but that boiler is not ready and available during the installation visit, the Contractor will be paid for that boiler, up to a maximum of twelve (12) boilers per installation visit. Supporting documentation (i.e., reconfirmation emails from installation POC not more than five (5) days prior to inspection) shall be sent to the COTR prior to or concurrent with invoice submission.

d. Task 4. COMPLETE INSPECTION REPORTS: For each inspection, the Inspector shall complete a copy of the attached inspection report form. Type "A" and Type "C" inspections shall be recorded on separate reports. All information required on the front and back of the report form shall be recorded completely and accurately. Information shall be typed or printed legibly in black ink. The reports shall record the condition of each boiler and the effect of any deficiencies, including corrosion, on safety, dependability, equipment life, and efficiency. The Inspector shall recommend repairs required to correct these deficiencies and any repairs needed for compliance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. The Inspector shall note the status of boiler plant equipment associated with each inspected boiler and any repairs needed to reduce corrosion and improve the efficiency and dependability of that equipment. Such equipment shall include condensate receivers and pumps, deaerator tanks, expansion tanks, feedwater/circulating pumps, water treatment devices, steam/hot water piping and valves, blowdown tanks, fuel oil pumps and tanks, and solid fuel feed and ash systems. Each report shall be signed by the Inspector performing the inspection. The installation POC or his/her representative witnessing the inspection will sign each report, attesting that the type of inspection listed was performed on the boiler listed and that the Inspector offered the original reports for copying. At the conclusion of each installation visit, the original completed inspection reports shall be made available to the installation POC for copying.

e. Task 5. SUBMIT INSPECTION REPORTS: The Contractor shall submit to the COTR each original completed inspection report. Reports shall be submitted with, or prior to, the Contractor's monthly report. The COTR will review and provide comments within two (2) weeks upon receipt. If Government comments are not provided within the two (2) weeks, the inspection reports will be considered approved. The Contractor shall coordinate corrections with the COTR within five (5) days after COTR notification.

f. Task 6. PERFORM BOILER EFFICIENCY AND EMISSIONS TESTS: Boiler stack temperature, efficiency, and emissions of O₂, CO, and NO_x shall be measured according to the final and confirmed schedule from Task 2. Tests shall be made with a portable combustion-gas analyzer in compliance with the USEPA Conditional Test Method CTM-034, Draft Method for the Determination of O₂, CO, & (NO and NO₂) for Periodic

Monitoring. All required equipment, supplies, and procedures are the responsibility of the Contractor. For each calibration verification and for each boiler measurement, data shall be scanned and recorded at 15-second intervals during the entire 15-minute measurement period. The analyzer shall produce data in, or electronically transfer data to, a Microsoft® Excel® file. The Contractor shall submit the analyzer data to the COTR in an unprotected Microsoft® Excel® file that allows the COTR full access to, and use of, all data and formulae. Data for each 15-minute measurement period shall be presented on a separate worksheet in the file. A separate file shall be submitted for each installation visit. Each file shall have a unique name.

Any analyzer used for tests shall comply with CTM-034 Sections 4 and 5. The Contractor shall submit analyzer verification to the COTR by the USEPA's Environmental Technology Verification Program (ETV) or verification by the following test. Per CTM-034, perform zero and span calibration verifications at cell temperatures in the sequence of 80 °F, 105 °F, 55 °F, and 80 °F. Analyzer adjustment shall precede the initial 80 °F verification. No analyzer adjustment shall be made during the verification sequence. Verification data shall include the analyzer brand, model, and serial number. Maximum allowable deviation of data from the average over the sequence of temperatures shall be 2 percent or 1 ppm, whichever is less restrictive. Any analyzer with data exceeding this deviation shall not be used for tests.

CTM-034 may be found at www.epa.gov/ttn/emc/ctm.html. The Contractor shall follow the procedure specified in CTM-034 and the following clarifications. If any of the following conflict with CTM-034, the following shall prevail:

(1) A Test Period shall be the period of time not to exceed ten (10) calendar days from the start of pre-test calibration verification to the end of post-test calibration verification. Analyzer adjustment shall precede the pre-test calibration verification and shall not be part of the Test Period. No analyzer adjustment shall be made during the Test Period. The brand name, model, and serial number of the analyzer used during the Test Period shall be included with the test data.

(2) The sample flow rate and analyzer cell temperature shall be recorded at each analyzer sample interval.

(3) NO₂ shall be measured directly, not estimated.

(4) For pre-test calibration adjustment, zero adjustment shall be done before span adjustment.

(5) Three (3) cylinders of span gases shall be used for analyzer calibration adjustment and verification. Certification of the gases from the vendor shall be submitted:

(a) One (1) cylinder shall have 200 ppm CO and 2% O₂ in nitrogen.

(b) One (1) cylinder shall have 80 ppm NO in nitrogen.

(c) One (1) cylinder shall have 80 ppm NO₂ in air.

(6) The analyzer shall be adjusted to, and verified with, 2% O₂.

(7) The allowable range for zero calibration error shall be:

(a) O₂: 1.7% to 2.3%

(b) CO: 0 ppm to 6 ppm

(c) NO: 0 ppm to 2 ppm

(d) NO₂: 0 ppm to 2 ppm.

(8) The allowable range for span calibration error shall be:

(a) O₂: 20.4% to 21.4%

(b) CO: 190 ppm to 210 ppm

(c) NO: 76 ppm to 84 ppm

(d) NO₂: 76 ppm to 84 ppm.

(9) The following limits on deviation from the average of data apply to all tests except boiler tests. For zero tests:

(a) O₂: +/- 0.3 % O₂

(b) CO, NO, NO₂: +/- 1 ppm

For span tests: O₂, CO, NO, NO₂: +/- 2 %

(10) If a boiler stack opening that complies with CTM-034 does not exist, the Contractor shall drill a minimal hole for insertion of the analyzer probe. During the measurements, the hole space around the probe shall be closed to prevent dilution of the stack gas and to prevent escape of stack gas into the boiler room. When measurement is finished, seal the opening gas-tight with material or device that will withstand temperature of 700 F.

(11) Boiler measurements shall be made when the boiler is operating continuously near normal pressure/temperature and above 60% capacity. The boiler firing rate control shall be in manual and locked in position to avoid fluctuation. Boiler data shall include the boiler pressure/temperature, the type of fuel being burned, and the percent of maximum capacity at which the boiler was operating during the test.

The installation POC or his/her representative shall accompany each Inspector to witness each boiler test. If a boiler cannot operate at an adequate capacity for the test, that boiler shall not be tested, the Contractor shall immediately notify the COTR and the installation POC or his/her representative, and the Inspector shall proceed to the next boiler. Payments will not be made for boilers that have been identified as being unprepared/unavailable by the installation POC per Task 2 above. If the Contractor has written documentation from the installation POC within the five (5) day period set forth in Task 2 verifying that a boiler will be ready and available during the installation visit, but that boiler is not ready and available during the installation visit, the Contractor will be paid for that boiler, up to a maximum of twelve (12) boilers per installation visit. Supporting documentation (i.e., reconfirmation emails from installation POC not more than five (5) days prior to inspection) shall be sent to the COTR prior to or concurrent with invoice submission.

4. GOVERNMENT FURNISHED MATERIALS/INFORMATION: The Government will furnish the following:

a. Schedule of proposed boiler inspections and tests

- b. Boiler inspection report form
- c. Preparation of each boiler for inspection
- d. Access to each boiler site
- e. A site POC representative to witness each inspection and test.

5. **CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE (COTR):** The CERL Contracting Officer Technical Representative (COTR) is Mr. Noel Potts, (217) 373-4576. The Alternate COTR is Ms. Susan Drozd, (217) 373-6767. Installation POCs are designated on the attached schedule of proposed boiler inspections. Although other Government personnel may clarify technical points or supply relevant information, only a Contracting Officer has the authority to revise any requirements in these specifications, including those resulting from verbal clarifications. The Government and the Contractor understand and agree that the services to be delivered under this task order by the Contractor to the Government are non-personal services. Furthermore, the parties recognize and agree that no employer-employee or master-servant relationships exist or shall exist under the task order between the Government and the Contractor's employees.

6. **MEETINGS/REVIEWS:** For each visit to each Army installation, the Contractor shall attend two (2) meetings with the installation POC or the POC's representative. One (1) meeting shall be to review inspection or testing strategy prior to performing inspections or tests and one (1) meeting shall be for review of inspection or test results. Each meeting shall be a maximum of two (2) hours in length at a mutually agreeable location and time and shall be part of the visit at that site.

7. **TRAVEL:** The Contractor is solely responsible for all travel costs and accommodations necessary to perform the work under this task order. Any travel required under this task order shall be used exclusively for the tasks, services, and requirements specified in this scope of work. Travel costs shall be proposed at the current rates set forth in the US Government Joint Travel Regulation (JTR) or rates approved by the Contracting Officer. The proposed inspection and test listing (attached) contains the number of visits anticipated per installation. See Section B, Line Item 0003, Travel.

8. REPORTS/DELIVERABLES: During the course of this task order, the Contractor shall submit the following report/deliverables to the COTR:

- a. Inspector Qualifications. Submit via electronic mail the qualifications of each proposed boiler Inspector per Task 1 prior to arranging an inspection visit with an installation POC. Include a copy of his/her NBBPVI Certificate. The COTR will review and notify the Contractor regarding concurrence within seven (7) working days of receipt.
- b. Combustion-Gas Analyzer Verification. Submit via electronic mail the verification for the combustion-gas analyzer(s) and calibration gas certification per Task 6 prior to arranging an installation visit to test boiler efficiency and emissions. The COTR will review and notify the Contractor regarding concurrence within seven (7) working days of receipt.
- c. Final Schedules for Installation Visits. A final schedule for each installation visit shall be submitted via electronic mail two (2) weeks before the visit date per Task 2. Format shall be the same as the attached schedule.
- d. Monthly Progress Reports. One (1) typed letter report describing progress on the project in the format and content specified at: <http://owwww.cecer.army.mil/contracts/formindex.html>. The report shall be as of the last day of the month and shall be transmitted via electronic mail, telefacsimile, or regular mail no later than the 10th calendar day following the end of the reporting period. The first and last report may cover more than a month with prior concurrence of the Government.

The report shall include the original completed inspection report forms per Task 5 and boiler test data per Task 6 if not previously submitted for that month. The COTR will review the inspection/test reports and provide comments in accordance with Task 5. The Contractor shall coordinate with the COTR any required revisions of the original inspection reports within five (5) working days of the receipt. The Contractor shall mail the original reports by commercial carrier to: US Army ERDC/CERL, ATTN: CEERD-CF-E (Noel Potts), 2902 Newmark Drive, Champaign, IL 61822-1076.
- e. Final Report: Within 10 (ten) months after contract award, a draft Final Report shall be submitted covering all contracted activity. The report shall be in the format and content specified at

<http://owwww.cecer.army.mil/contracts/formindex.html>. The “approach” section of the report shall include a detailed narrative of typical pre- and post-inspection meetings, the logistics of preparing each inspection report and obtaining the Installation Representative’s signature, and the process used to make Type “A” and “C” inspections as well as efficiency/emission tests. The “summary” shall include a Table showing for each boiler the condition rating for Type “A” and “C” inspections and its efficiency and emissions. CERL will provide review comments, if any, within one (1) month of receipt of the draft. Within twelve (12) months after award, a Final Report incorporating CERL review comments shall be transmitted via electronic mail.

f. Invoices. Invoices for partial payment shall be submitted to the CERL to coincide with the COTR’s approval of the monthly progress reports. No partial payment will be approved unless the Government has received all progress reports that are due. Partial payments will be based on completed/signed inspection reports submitted to the COTR. The final invoice will not be paid until all inspection report corrections have been resolved.

Invoices shall identify each contract line item separately on the invoice and be in accordance with the Unit Prices:

- Line Item 0001 shall be in accordance with the Boiler Inspection Unit Price for actual inspections performed in accordance with the Statement of Work. The invoice shall identify the number of inspections by location. The invoice shall also identify boilers that were not ready or available for inspection.
- Line Item 0002 shall be in accordance with the Boiler Efficiency and Emission Test Unit Price for actual tests performed in accordance with the Statement of Work. The invoice shall identify the number of tests by location. The invoice shall also identify boilers that were not ready or available for testing.
- Line Item 0003 shall be in accordance with the Unit Price Per Trip. The invoice shall identify the number of trips by region.
- Two invoices per month may be submitted based on the following conditions: CLINs 0001 and 0002 shall be invoiced only once per month; however, they may be invoiced on separate invoices. If CLINs 0001 and 0002 are invoiced separately, CLIN 0003 may be invoiced twice – once on each invoice.

g. DD Form 882: The Contractor shall submit to the CERL Receiving Clerk a DD Form 882 in accordance with Section I, Clause No. 252.227-7039, "Patents – Reporting of Subject Inventions." As the period of service of this contract is not in excess of eighteen (18) months, no interim DD Form 882 is required.

h. Accounting for Contractor Services: The Office of the Assistant Secretary of the Army (Manpower & Reserve Affairs) operates and maintains a secure Army data collection site where the Contractor will report ALL Contractor manpower (including subcontractor manpower) required for performance of this contract. The Contractor is required to completely fill in all the information in the format using the following web address: <https://cmra.army.mil/>. The required information includes: (1) Contracting Office, Contracting Officer, Contracting Officer's Technical Representative; (2) Contract number, including task and delivery order number; (3) Beginning and ending dates covered by reporting period; (4) Contractor name, address, phone number, email address, identity of Contractor employee entering data; (5) Estimated direct labor hours (including subcontractors); (6) Estimated direct labor dollars paid this reporting period (including sub-contractors); (7) Total payments (including sub-contractors); (8) Predominant Federal Service Code (FSC) reflecting services provided by Contractor (and separate predominant FSC for each subcontractor if different); (9) Estimated data collection cost; (10) Organizational title associated with the Unit Identification Code (UIC) for the Army Requiring Activity (the Army Requiring Activity is responsible for providing the Contractor with its UIC for the purposes of reporting this information); (11) Locations where Contractor and sub-contractors perform the work (specified by zip code in the United States and nearest city, country, when in an overseas location, using standardized nomenclature provided on website); (12) Presence of deployment or contingency contract language; and (13) Number of Contractor and subcontractor employees deployed in theater this reporting period (by country). As part of its submission, the Contractor will also provide the estimated total cost (if any) incurred to comply with this reporting requirement. Reporting period will be the period of performance not to exceed twelve (12) months ending 30 September of each Government fiscal year and must be reported by 31 October of each calendar year. Contractors may use a direct XML data transfer to the database server or fill in the fields on the website. The XML direct transfer is a format for transferring files from a Contractor's systems to the secure web site without the need for separate data entries for each

required data element at the web site. The specific formats for the XML direct transfer may be downloaded from the web site.

NDA DATA	
UIC	W2R2AA - Military Appropriations
FSC	AG44
Contract Number	Complete with the award number listed in Block 2 of the Standard Form 26 or 33
Contract Fiscal Year	2011
Form of Contract Action	Order under Indefinite Delivery Contract
Contract Type	Firm Fixed Price
PBSA	No
Non-DoD Purchasing Agency	(leave blank)
Competed Action	Not Available for Competition
If Competed, number of offerors	NA (enter correct number)
Small Business	Yes
Small Disadvantaged Business	Yes
Women-owned Small Business	NO
DoD Administering Component	USA- USACE CERL, Champaign
Contracting Organization	USA-USACE CERL, Champaign

9. PERIOD OF SERVICE: All installation visits shall be completed by 31 August 2012. All work to be performed under this contract shall be completed by 12 September 2012.

Section E - Inspection and Acceptance

INSPECTION AND ACCEPTANCE TERMS

Supplies/services will be inspected/accepted at:

CLIN	INSPECT AT	INSPECT BY	ACCEPT AT	ACCEPT BY
0001	Destination	Government	Destination	Government
0002	Destination	Government	Destination	Government
0003	Destination	Government	Destination	Government

Section F - Deliveries or Performance

DELIVERY INFORMATION

CLIN	DELIVERY DATE	QUANTITY	SHIP TO ADDRESS	UIC
0001	12-SEP-2012	247,632	PR W2R2 CONST ENGR LAB 2902 NEWMARK DRIVE P.O. BOX 9005 CHAMPAIGN IL 61826-9005 FOB: Destination	W52EU2
0002	12-SEP-2012	45,792	PR W2R2 CONST ENGR LAB SEE ORDER FOR DELIVERY ADDRESS 2902 NEWMARK DRIVE P.O. BOX 9005 CHAMPAIGN IL 61826-9005 FOB: Destination	W52EU2
0003	12-SEP-2012	40,000	(SAME AS PREVIOUS LOCATION) FOB: Destination	W52EU2

Section G - Contract Administration Data

ACCOUNTING AND APPROPRIATION DATA

AA: 21 NA 2011 2040.0000 U4 2011 08 8140 622784T4000 22079 255Y 6B27LG

AMOUNT: \$333,424.00

CIN W81EWF110305210001: \$247,632.00

CIN W81EWF110305210002: \$45,792.00

CIN W81EWF110305210003: \$40,000.00

For Informational Purposes Only: The Source Appropriation from Customer Order W74RDV11737517E is as follows: 21 NA 2011 2020.0000 S0 2011 08 8008 43701811000 25FB NA 44213 00008735.

G.1. DISSEMINATION OF CONTRACT INFORMATION: The Contractor shall be free to publish, permit to be published, or distribute for public consumption, any information, oral or written, concerning the results of conclusions made pursuant to performance of this contract; provided, however, that it shall provide copies of any such publication or release of information to the Government's Contracting Officer for review and comment at least fourteen (14) days prior to any such release.

G.2. METHOD OF PAYMENT: With reference to Section I of the Basic IDIQ Contract, Clauses No. 52.232-2, PAYMENTS UNDER FIXED-PRICE RESEARCH AND DEVELOPMENT CONTRACTS, and 252.232-7003 ELECTRONIC SUBMISSION OF PAYMENT REQUESTS, and Section E of the Basic IDIQ Contract, DFARS Clause 252.246-7000, MATERIAL

INSPECTION AND RECEIVING REPORT, at the Contractor's Option he may, (a) upon completion of the work, submit one invoice for payment of the entire amount due under the task order in one lump sum, or (b) submit estimates of the amount and value of the work and services performed under the task order at any time during the period of performance, but not more frequently than once a month or for amounts less than \$1000 (unless a final invoice). Procedures for submitting partial invoices under (b) above are as follows:

G.2.a. Upon approval of such estimate by the Contracting Officer's Representative (COR) or Contracting Officer's Technical Representative (COTR), partial payment upon properly certified vouchers will be made to the Contractor as soon as practicable of the amount determined to be due, less all previous payments.

G.2.b. Upon completion by the Contractor of the work to be performed under the task order, acceptance of such work by the Government, and receipt of DD Form 882 (reference Section I of the Basic IDIQ Contract, Clause 252.227-7039), the Contractor will be paid the balance of any money due for work performed.

G.2.c. Invoicing: If this is an indefinite delivery contract, the payment office will be specified on each individual task order in Block 15 of the DD Form 1155.

WAWF Instructions

Contractor shall submit payment requests using Wide Area Workflow (WAWF) (see instructions below).

The WAWF application allows DoD vendors to submit and track Invoices and Receipt/Acceptance documents electronically if the payment office is a Defense Finance and Accounting Service (DFAS) office.

The following codes and information will be required to assure successful flow of WAWF documents.

VALID WAWF INVOICE TYPES

[X] *Invoice (Contractor Only)*

VALID CODES

DFAS DODAAC: **W916TX**

CEFMS DATABASE (for internal purposes only): **U4**

ISSUE BY, ADMIN BY, and ACCEPT BY DODAAC: **W9132T**

SHIP TO DODAAC: **W52EU2**

PAYMENT OFFICE FISCAL STATION CODE: **S22079**

WAWF EMAIL POINTS OF CONTACT LISTING: The Contractor shall send WAWF email invoice notifications to those listed below:

COR/COTR: See Section C, Statement of Work

ACCEPTOR: _____ Natasha.Haynes@usace.army.mil and Kim.D.Roberson@usace.army.mil

CERL.INVOICING@USACE.ARMY.MIL *This additional notification is important to ensure that the Government is aware that the invoice documents have been submitted into WAWF.*

ADMINISTRATIVE EMAIL POINTS OF CONTACT LISTING:

CONTRACT ADMINISTRATOR:

_____ Vickie.Swan@us.army.mil

CONTRACTING OFFICER:

_____ Gregory.E.Denman@usace.army.mil

The Contractor shall:

- Register to use WAWF at <https://wawf.eb.mil>
- Ensure an electronic business Point of Contact (POC) is designated in the Central Contractor Registration site at <http://www.ccr.gov> within ten (10) calendar days after award of this task order.

- Submit invoices in WAWF using the valid codes and email addresses provided above.
- **Attach a DD 250(s) to the invoice in WAWF.** The following website provides blank DD Forms 250 and 882:
<http://www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm>.

The Acceptor will:

- Request payment recommendations from the COR/COTR via email.
- Upon receipt of a response to pay from the COR/COTR, process a receiving report in CEFMS.

The COR/COTR will:

- Respond to the Acceptor's request for payment recommendation within two (2) work days, via email, based on the Contractor's progress-to-date.
- Document the COR/COTR file with the payment recommendation.

The Contractor will be notified if the above information changes.

G.3. PAYMENT INSTRUCTIONS FOR MULTIPLE ACCOUNTING CLASSIFICATIONS CITATION: If there is more than one ACRN within a contract line item, the payment office will make payment using one of the processes listed below in the sequence listed, if applicable.

G.3.a. If there is more than one ACRN within a contract line item, the payment office will make payment using the oldest fiscal year appropriations first, exhausting all funds in the previous fiscal year before disbursing from the next fiscal year. In the event there is more than one ACRN associated with the same fiscal year, the payment amount shall be disbursed from each ACRN within a fiscal year in the same proportion as the amount of funding obligated for each ACRN within the fiscal year; or

G.3.b. If there is more than one ACRN within a contract line item, the payment office will make payment in sequential ACRN order within the line item, exhausting all funds in the previous ACRN before paying from the next ACRN using the following sequential order: Alpha/Alpha; Alpha/numeric; numeric/alpha; and numeric/numeric.

Section J - List of Documents, Exhibits and Other Attachments

QASP

J.1. ADDITIONAL DUTIES OF THE CONTRACTING OFFICER'S REPRESENTATIVE (COR)/CONTRACTING OFFICER'S

TECHNICAL REPRESENTATIVE (COTR): In addition to the duties and limitations specified under the basic contract, the COR/COTR will be responsible for completion of the general surveillance procedures in the Quality Assurance Surveillance Plan (QASP) included as Attachment 1 of this Section J.

ATTACHMENT 1

QUALITY ASSURANCE SURVEILLANCE PLAN

for

**ASSESSMENT OF CORROSION IN BOILERS AT US ARMY
INSTALLATIONS**

1. INTRODUCTION

1.1. This Quality Assurance Surveillance Plan (QASP) has been developed to provide a systematic and effective method of surveillance of the Contractor's performance of the services contained in the Statement of Work.

1.2. The object of this surveillance plan is to evaluate the Contractor's performance in key areas with the primary interest in the timeliness, content, and coordination resulting in the quality of the final product.

1.3. The Contractor shall be responsible for Fully Successful performance of the services and products delivered under the task order. Determination of the adequacy of the Contractor's performance will be based on critical factors as described below. The Government may elect to pursue formal contract remedies if the Contractor's performance falls below the Fully Successful level in one or more areas.

2. GENERAL SURVEILLANCE PROCEDURES

2.1. The COR/COTR will document surveillance on Individual Checklists by recording observations and defects. Checklists will be completed and forwarded to the Contracting Officer no later than five (5) days after the due date specified in the contract for each inspected item.

2.2. Acceptance of the Contractor's performance shall be based on the Fully Successful levels listed below. Any unsatisfactory observations will be provided to the Contractor with an opportunity for correction. These documents will then become part of the official contract file.

3. SURVEILLANCE PLAN

3.1. Inspector Qualifications: As required by Paragraph 8.a. of the Statement of Work.

3.1.1. Method of Surveillance: Review by COR/COTR.

3.1.2. Criteria for Acceptance:

3.1.2.1. Submitted by required deadline

3.1.2.2. Copy of Inspector's NBBPVI Certificate included.

3.2. Combustion-Gas Analyzer Verification. As required by Paragraph 8.b. of the Statement of Work.

3.2.1. Method of Surveillance: Review by COR/COTR.

3.2.2. Criteria for Acceptance:

3.2.2.1. Submitted by required deadline

3.2.2.2. Submitted email verification for analyzer and calibration certification

3.3. Final Schedules for Installation Visits. As required by Paragraph 8.c. of the Statement of Work.

3.3.1. Method of Surveillance: Review by COR/COTR.

3.3.2. Criteria for Acceptance:

3.3.2.1. Submitted by required deadline

3.3.2.2. Submitted Final Schedule

3.4. Monthly Progress Reports: As required by Paragraph 8.d. of the Statement of Work.

3.4.1. Method of Surveillance: Review by COR/COTR

3.4.2. Criteria for Acceptance:**3.4.2.1. Submitted by required deadline**

3.4.2.2. Essential information is presented in a clear, concise, and accurate manner

3.4.2.3. Assembled data is analyzed, interpreted, and presented clearly, concisely, and accurately, in an acceptable format and without the need for major revisions

3.4.2.4. Writing meets acceptable professional standards for grammar, spelling, and composition

3.5. Draft Report: A Final Report per Paragraph 8.e. of the Statement of Work documenting all the task reports.

3.5.1. Method of Surveillance: Review by COR**3.5.2. Criteria for Acceptance:****3.5.2.1. Submitted by required deadline**

3.5.2.2. Essential information is presented in a clear, concise, and accurate manner

3.5.2.3. Assembled data is analyzed, interpreted, and presented clearly, concisely, and accurately, in an acceptable format and without the need for major revisions

3.5.2.4. Writing meets acceptable professional standards for grammar, spelling, and composition

3.6. Final Report: A Final Report per Paragraph 8.e. of the Statement of Work documenting all the task reports.

3.6.1. Method of Surveillance: Review by COR**3.6.2. Criteria for Acceptance:****3.6.2.1. Submitted by required deadline**

3.6.2.2. Essential information is presented in a clear, concise, and accurate manner

3.6.2.3. Assembled data is analyzed, interpreted, and presented clearly, concisely, and accurately, in an acceptable format and without the need for major revisions

3.6.2.4. Writing meets acceptable professional standards for grammar, spelling, and composition

3.7. DD Form 882, Report of Inventions: As required by Paragraph 8.g. of the Statement of **Work**.

3.7.1. Method of Surveillance: Review by COR/COTR

3.7.2. Criteria for Acceptance:

3.7.2.1. Submitted by required deadline

3.7.2.2. Essential information is presented in a clear, concise, and accurate manner

3.7.2.3. Assembled data is analyzed, interpreted, and presented clearly, concisely, and accurately, in an acceptable format and without the need for major revisions

3.7.2.4. Writing meets acceptable professional standards for grammar, spelling, and composition

3.8. Contractor Manpower Reporting: As required by Paragraph 8.h. of the Statement of Work:

The Office of the Assistant Secretary of the Army (Manpower & Reserve Affairs) operates and maintains a secure Army data collection site where the Contractor will report ALL Contractor manpower (including subcontractor manpower) required for performance of this contract. The Contractor is required to completely fill in all the information in the format using the following web address: <https://contractormanpower.army.pentagon.mil>. Reporting period will be the period of performance not to exceed 12 months ending 30 September of each Government fiscal year and must be reported by 31 October of each calendar year.

3.8.1. Method of Surveillance: Review by COR/COTR

3.8.2. Criteria for Acceptance:

3.8.2.1. Submitted by required deadline

3.8.2.2. Essential information is presented in a clear, concise, and accurate manner

3.8.2.3. Assembled data is analyzed, interpreted, and presented clearly, concisely, and accurately, in an acceptable format and without the need

for major revisions

3.8.2.4. Writing meets acceptable professional standards for grammar, spelling, and composition

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
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1. REPORT DATE (DD-MM-YYYY) 10-08-2013		2. REPORT TYPE Final		3. DATES COVERED (From - To)	
4. TITLE AND SUBTITLE Providing Boiler Inspections at US Army Installations: How To Perform Internal/Operational, Efficiency, and Emissions Testing				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT	
6. AUTHOR(S) Noel L. Potts				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) US Army Engineer Research and Development Center (ERDC) Construction Engineering Research Laboratory (CERL) PO Box 9005, Champaign, IL 61826-9005				8. PERFORMING ORGANIZATION REPORT NUMBER ERDC/CERL TR-13-9	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Headquarters, US Army Installation Management Command (HQIMCOM) Energy and Utilities Branch G4 Public Works Division Fort Sam Houston, TX 78234-1223				10. SPONSOR/MONITOR'S ACRONYM(S) HQIMCOM	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT US Army Regulation (AR) 420-1, Army Facilities Management, paragraph 23-36.d requires the inspection of all actively used high-pressure and high-temperature boilers at Army installations. These inspections identify and evaluate the effects on boiler condition and operation of improper water treatment, soot accumulation, and improper boiler installation. Improper water treatment in boilers can lead to corrosion and scaling of wetted surfaces, which in turn reduces equipment life and compromises operating efficiency. Regular inspections also identify repairs needed to ensure that the boilers will operate safely. This work provided boiler inspections at Army installations to identify deficiencies and provide recommendations for reducing corrosion and improving the efficiency and dependability of the boilers and associated boiler plant equipment. For a select number of boilers, measurements of efficiency and emissions were also taken.					
15. SUBJECT TERMS audit, energy conservation, water conservation					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 78	19a. NAME OF RESPONSIBLE PERSON
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)